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MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES, and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

December 10, 1975.

PROCEEDINGS AT INQUIRY

Volume 100

CANADIAN ARCTIC
GAS STUDY LTD.

DEC 17 1975

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APPEARANCES:

Mr. Ian G. Scott, Q.C.,
Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley Pipeline Inquiry;

Mr. Pierre Genest, Q.C.,
Mr. Jack Marshall, and
Mr. Darryl Carter for Canadian Arctic Gas Pipeline Limited;

Mr. Reginald Gibbs, Q.C.,
Mr. Alan Hollingworth &
Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;

Mr. Russell Anthony &
Pro. Alastair Lucas for Canadian Arctic Resources Committee;

Mr. Glen W. Bell and
Mr. Gerry Sutton, for Northwest Territories Indian Brotherhood, and Metis Association of the Northwest Territories;

Mr. John Bayly
or
Miss Leslie Lane for Inuit Tapirisat of Canada, and The Committee for Original Peoples Entitlement;

Mr. Ron Veale and
Mr. Allen Lueck for The Council for the Yukon Indians;

Mr. Carson H. Templeton, for Environment Protection Board;

Mr. David Reesor for Northwest Territories Association of Municipalities;

Mr. Murray Sigler for Northwest Territories Chamber of Commerce.

I N D E X

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Worth HAYDEN
George FINNEY
Paul H. WHITNEY
Norbert G. KONDLA

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Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Bayly

Yellowknife, N.W.T.

December 10, 1975.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

LEO W. BOUCKHOUT,
WORTH HAYDEN
GEORGE FINNEY
PAUL H. WHITNEY
NORBERT G. KONDLA, resumed:

CROSS-EXAMINATION BY MR. BAYLY (CONTINUED):

Q Gentlemen, when we had one of your earlier panels on, there was some indication that its members had taken a cursory look at going across the North Slope to pick up Prudhoe Bay gas, should that be a requirement of a right-of-way granted Foothills. Have you received any instructions of that sort to take a look at the environmental point of view?

WITNESS BOUCKHOUT: No, nothing has been done along those lines.

Q And in addition to nothing being done, you've received no instructions to do anything like that in the future?

A That's correct.

Q One of the concerns that we have is with regard to substances which may be potentially toxic to animals, plants and birds, and have the consultants to Foothills looked at the substances that are intended to be used on this project and given opinions to Foothills with regard to use of these substances, or alternates?

A Are you addressing that question to me, Mr. Bayly?

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Q Let's start with you,
Mr. Bouckhout, yes.

A The consultants to
Foothills have been made aware of what substances,
including hydro-carbon, various hydro-carbon fuels,
lubricants, menthanol, etc., which would be used on
the project. They have been asked to take into consider-
ation the use and potential disposal of these substances
with regards to the various subject areas.

Q And are they being
given a list of alternates, as well as the intended
substances to be used so that they can make judgments
where one might be more or less harmful than another?

A Not per se. With regards
to hydrostatic testing, for instance, we have discussed
with the consultants the various modes of hydrostatic
testing. However, they have not been asked to comment
on the relative merits of the various types.

Q All right then, is that
list that has been passed onto them available and could
it be produced for the Inquiry?

A A list was not actually
given to them. This was done in various discussions in
various meetings with them.

Q Do you have such a list
of substances that you would intend to use so that they
could be assessed by the Inquiry and their environmental
impacts looked at by others?

A I believe our engineering

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1
2 group would certainly have a list of the substances
3 which they plan to use.

4 MR. BAYLY: I wonder, Mr.
5 Commissioner, if it would be possible at some point
6 in the Inquiry for that list to be produced? Is there
7 any objections from Foothills to that request?

8 MR. HOLLINGWORTH: If it
9 exists, or if it can be prepared we'll produce it.

10 MR. BAYLY: Q Now, if I can
11 turn to your evidence at page 8.

12 A Excuse me, Mr. Bayly,
13 a point of clarification on this list of substances,
14 are you referring directly to such things as fuels,
15 lubricants, methanol and so on?

16 Q Yes.

17 A As substances.

18 Q I'm referring to the
19 various substances you will be using in testing and
20 in operating compressor stations, etc., fuels for
21 your vehicles, lubricants for your machinery, etc.

22 I wonder, Mr. Commissioner,
23 is it possible to turn off the Muzak? It is being done,
24 all right. It has produced a cheerier look on Mr.
25 Marshall's face.

26 At page 8 you refer to a
27 manual that you will be preparing, and the manual
28 according to the first paragraph at the end of question
29 6 includes:

30 "Procedures for application to unanticipated events".

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Cross-Exam by Bayly

1
2 I take it what you mean by that is events which you
3 have anticipated the possibility of.

4 A Yes, that's right. They
5 would be procedures which would be used at the discre-
6 tion of the inspector on the job. There will be certain
7 set procedures which of course will be followed irre-
8 gardless, and then there will be certain additional
9 procedures which could be used at the discretion of
10 the individual environmental inspector on the job.

11 Q And your evidence seems
12 to indicate that there may be certain unforeseen events
13 that you can't plan for in the manual and will be the
14 subject of on-site decisions.

15 A Yes, that's right.

16 Q Will you have a procedure
17 similar to that of Arctic Gas, of trying to do on-site
18 decisions but referring back to your head office,
19 either your regional head office in Yellowknife or your
20 Alberta head office for more specific instructions?

21 A Well, as I've explained
22 before, with regards to the environmental inspection
23 staff, as I view it at this stage, it's a multi-level
24 organization with people directly on the spread
25 responsible for the spread. The next level up would
26 be people responsible for a particular district in which there
27 may be two to three spreads, and another level beyond
28 that up into senior management. So it would be
29 a matter at what particular level such decisions would
30 have to be made or could be made.

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Q And will you be using
as a management tool the critical path technique that
was described to some extent by Mr. Hemstock for
Arctic Gas?

1 A We have contemplated,
2 at least I, myself, have contemplated developing, and
3 I intend to do that early in the new year, a critical
4 path type of thing for actual environmental inputs
5 from this stage through construction into operation
6 and maintenance. As far as utilizing a critical
7 path system for inspection and so on, I haven't
8 given any particular thought to that.

9 Q Have you thought about
10 this with the engineers, or just with the environmental
11 experts that you have?

12 A No, this would be
13 inputs with the engineers as well as the environ-
14 mental staff, and we have discussed this.

15 Q Now, I gather the
16 sort of thing that is difficult to plan for, if we
17 can use an example is the situation that occurred
18 on the Kotaneelee River crossing on the Pointed
19 Mountain line where, I remember Dr. Hardy's evidence
20 for Arctic Gas, the river did something quite un-
21 expected that had not been predicted even as a
22 possibility, and those are the types of problems that
23 you can't put into the manual.

24 A Yes, well, as I have
25 that story, the river did something which was initially
26 unexpected but immediately prior to the actual occur-
27 ence it was expected, and something could have been
28 done, but apparently the decision or the authority
29 to go ahead and do that particular thing was not
30 forthcoming.

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1 Q Have you studied that
2 particular problem to see how you can avoid getting into
3 the sort of situation you just described? You seem
4 to have indicated that they could have done something
5 if they'd moved quickly enough, as soon as they'd
6 realized it was going to happen. Have you devised
7 techniques that will enable your project to overcome
8 those organizational difficulties?

9 A Well, in regards to
10 this I might qualify a bit. The Kotaneelee situation
11 as I know it, which is just as I know it, not necessarily
12 the actual way it occurred and it had something to do
13 with the log jam or an ice jam which formed and a
14 request was made to blow that particular jam prior to
15 major water backup and apparently the ascension
16 to that request was not forthcoming quickly enough-
17 to do anything about it.

18 Now, in regards to our
19 own system, this all really gets back to the co-
20 ordination between the applicant or the certified
21 applicant, whoever that might be, and the government
22 agencies, to make sure that they are working along
23 parallel courses and very well understand the
24 authorities and responsibilities of both the regulatory
25 agencies and the applicant and to make sure that there
26 is an adequate co-ordination at various levels so that
27 these sorts of things can be reacted to quickly
28 and there can be previous planning to those situations
29 for those types of situations which might be
30 expected; beyond that there might be very rapid

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1 reaction to something which was not expected and
2 I would like to see that done through very close
3 co-operation between the regulatory agency and the
4 applicant with the people on site if possible.

5 Q So the assumption that
6 the regulatory agency will be able to deal with
7 these problems in an effective way becomes very im-
8 portant in this kind of situation?

9 A I think in this
10 regard when we are talking about authority and
11 responsibility and so on, obviously the regulatory
12 agencies are intricately involved.

13 Q Now, that particular
14 example, I suggest to you is an interesting one from
15 the point of view of mitigation, because as I
16 understand, they have gone back again this year to
17 try and recover and fight for additional time.

18
19 A That depends on what
20 you are talking about. I understand certainly they
21 have been doing work on that particular crossing,
22 particularly on the south slope of the Kotaneelee
23 for the last couple of years in an attempt to
24 repair it. I know they have sandbagged it, spent
25 several weeks trying to armour the sand slope with
26 sand bags and so on.

27 Q I gather you were going
28 to try and avoid situations where your mitigative
29 measures have to take place in a water course over
30 a period of a couple of years.. You want repairs

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1 to be able to take place very quickly.

2 A Yes, that is right. I
3 might add that we have had a look at the Kotaneelee
4 situation and I have been told by our route location
5 people that nowhere on our line do we have a slope
6 of that magnitude.

7 Q And this would be a
8 particular concern of yours, Mr. Hayden, I would
9 suggest, that you would be recommending that crossings
10 be designed so that they would have to be repaired,
11 you don't have to do it year after year ?

12 WITNESS HAYDEN: That is
13 right, our advice generally is directed toward
14 spending the least amount of time possible in a drainage
15 itself and going there as few times as possible.

16 Q Have you been studying
17 or monitoring the effects on benthic invertebrates
18 of the Kotaneelee crossing and the subsequent
19 repairs to see whether it has^{had} any downstream effects
20 on the populations or propagation?

21 A Have I?

22 Q Yes.

23 A No, I haven't done
24 that. I have reviewed literature basically on the
25 effect of disturbance on invertebrate populations
26 downstream, that is the extent --

27 Q Yes, Mr. Bouckhout,
28 is somebody that you have access to doing this
29 work so that you can assess the impacts and perhaps
30 learn from this situation what the effects may be

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1 on certain aquatic species and particularly
2 benthic invertebrates?

3 WITNESS BOUCKHOUT: I am
4 not personally aware of any such studies which
5 are being undertaken. They could quite possibly
6 could be, but I am not personally aware of it.

7 Q Now, on page five of
8 your prepared evidence, you refer to an example --

9 A Yes, a hypothetical
10 example --

11 Q And the example that
12 you give is a very significant waterfowl staging
13 area. Now, I hope that I am not getting into the
14 same situation I did with Dr. McCart, but perhaps
15 you can explain or at least illustrate what you
16 mean by very significant waterfowl staging area?

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Cross-Exam by Bayly

1
2 A Well, I must start by
3 saying I'm not an avian biologist and I wrote this
4 as manager of Environmental Affairs rather than as an
5 avian biologist. I simply gave the example to illus-
6 trate the various modes by which/ⁱⁿenvironmental circum-
7 stances or an environmental concern could be coped with
8 and in regards to my reference to a very significant
9 waterfowl staging area I was simply trying to set the
10 stage in saying that here we have a major environmental
11 concern, an area of major environmental concern. Now
12 if you're asking me for an actual definition of "a
13 very significant waterfowl staging area" I couldn't
14 give it to you in numbers or in densities of birds or
15 whatever. It's simply to illustrate that what I'm talk-
16 ing about is, let's take this potentially significant
17 concern and work around it to see what could potentially
18 be done with it.

19 Q Well, what I'm concerned
20 with, and perhaps Dr. Finney can help us here, is that
21 there may be areas that fall into what he would call
22 the very significant category, where he would recommend
23 that the risks involved are so high that avoidance,
24 either at the time of year or avoidance of the entire
25 location by going around it, may be the only solution
26 worth the risk, and that may depend on the significance
27 if you will, of that location to the bird population,
28 to its staging, its nesting or whatever may be involved.
29 Would you agree with that, Dr. Finney?

30 WITNESS FINNEY: Well, certainly

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1 in assessing the possibility for impact in an area you
2 do take into account two factors: First of all the
3 probability of an event occurring that's going to cause
4 harm or potential harm, and second of all, if that
5 event occurs what is the probability of harm? Does
6 that answer your question?

7 Q Well, it does in a
8 sense. Perhaps we can just keep you on for a couple of
9 minutes. I'm suggesting to you that in the example that
10 Mr. Bouckhout has given you may very well recommend
11 that certain of the options should not be exercised,
12 that you can only go so far, depending on the signifi-
13 cance of the area, without taking risks that you would
14 recommend not taking.

15 A In a hypothetical case, I
16 agree with you.

17 Q I'm trying to use the
18 hypothetical case that's been given to us in the evi-
19 dence. Now, when you read the term, "very significant
20 waterfowl staging area", does that, in terms of your
21 discipline, mean something in particular? Or did
22 Mr. Bouckhout not check this out with you before he
23 wrote it?

24 A No, he didn't check
25 his evidence with me. Perhaps I can only give you
26 an example, Mr. Bayly. In the area downstream from
27 Axe Point on a fall survey we discovered 5,000 water-
28 fowl. Upstream from that in the Mills Lake, Beaver
29 Lake area there were several hundred thousand water-
30 fowl. Irrespective of that, the 5,000 that were

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1 downstream of Axe Point are of concern to me. Now
2 I don't know that I want to go out on a limb and say
3 how significant my concern, mildly significant, very
4 significant, tremendously significant or significant
5 per se. It's, you know, I am concerned about it.

6 Q All right, If you were in
7 the situation of trying to mitigate, in that area, say
8 the Mills Lake area, and just take for example that you
9 knew a facility were going in there, perhaps a staging
10 area, that is staging for materials rather than for
11 birds in this case, would you recommend re-locating that
12 or would you follow the other steps that Mr. Bouckhout
13 has suggested and be prepared to figure out ways of
14 accommodating birds to the other solutions?

15 A You're getting into a
16 line of my subjective opinion. I guess that's exactly
17 where you want to be. The problem as I see it, poten-
18 tial problem with Axe Point is that fuel will be stored
19 there. There's a chance therefore for a spill. I
20 have been talking to the logistics people at Foothills
21 and they have guaranteed me that they will put a
22 boom around the area every time that they are transfer-
23 ring fuel from land to the barge. They have also agreed
24 to consider putting up, an essentially a little harbor,
25 just a steel wall box into which the barge enters
26 before the barge is filled with fuel, and if there's
27 any spill then the mess is cleaned up inside that
28 box and it doesn't get away. I think that that's
29 adequate for 5,000 birds, in that the chance of fuel
30 getting away downstream is made minimal enough and the

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1 risk after all is not that tremendous that it could
2 cause a very bad problem, you lose 5,000 birds, and
3 that would not be good, certainly.

4 If the same type of operation
5 were being suggested at the ferry crossing, for example,
6 I think that I would recommend moving that operation
7 because then, in that case, even with all of the protec-
8 tion measures, you could be talking about 100,000
9 waterfowl.

10 Q All right. Well, you
11 sat in through the evidence of Dr. Gunn where he had
12 said that he had advised Arctic Gas about a certain
13 test dredging operation in Shallow Bay, and that opera-
14 tion was not shut down despite his advice. What I am
15 concerned about is when you give advice saying, "You
16 should move a staging site," have you assurances that
17 that is going to be listened to seriously, or are
18 you going to be faced with having to compromise and
19 use one of the other methods, and accept the risk to
20 5,000 geese -- and I suggest to you not just 5,000
21 geese but say at Axe Point the loss of a staging area
22 if oil were spilled on the ground it might be a problem
23 that would occur over more than one year.

24 A Well, that's not the
25 situation, because actually in the area of Axe Point
26 itself, there is no problem with staging birds of any
27 type. The area of concern to me is about three or four
28 miles downstream. So a spill on the land would not
29 affect future years, but I think that is ancillary
30 to the major point you are making. I have confidence that

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1 I have a good working relationship with Foothills.
2
3 Until they prove otherwise to me, I will continue to
4 have that faith. In other words, when I recommend
5 things, I often adopt the point of view of first of
6 all adopting the position of avoidance, as sort of a
7 test to find out if anybody has objections to moving
8 a wharf-site / ^{or not,} like I may as well as a first attempt
9 say, "Well, why don't you move that wharf site?"

10 And if they say, "Well, we
11 had three or four wharf sites considered anyway, con-
12 sider it done," well then I'm happy and they're happy.

13 My position is bound to change
14 if they came back and said, "We don't have any good
15 options here. If we can't put in the wharf site
16 here we might have to move 30-40 miles and even then
17 we'll be on worse ground."

18 In ~~that~~ case I think that I
19 might reconsider, from a commonsense point of view, and
20 I would have to consider what is the actual risk more
21 seriously.
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1 Q Now, you have said,
2 and this is a question that can go to all the consultants,
3 that your recommendations have to date been given
4 proper consideration. Now, in reading through your
5 evidence it appears that most of the recommendations
6 you have made are still under consideration and
7 some have been responded to favourably, but they are
8 approximately 25% of the ones that you refer to in your
9 evidence. When do you expect to hear about the rest?
10 How long does this process take?

11 WITNESS BOUCKHOUT: Well
12 this really depends upon what is necessary to evaluate
13 the recommendation. You are referring obviously to
14 the table appended my own evidence and, as you say,
15 some of the recommendations have been accepted while
16 others are pending, either further or geotechnical or
17 further environmental information, or some of the
18 recommendations, maybe with regards to a fairly minor
19 change in alignment and the recommendations here
20 really pending re-evaluation of the location on
21 controlled ortho photomosaics. So in regards to
22 when one reaches a point that they can consider a
23 recommendation and make a final judgment on it, it's
24 really in reference to when adequate information, both
25 from the environmental and from the geotechnical
26 engineering point of view is available. For instance,
27 someone might recommend that we move the location
28 because it is fairly close to a possible fishing
29 area for a local community. Now, if we find when we
30 recheck this particular line on the controlled ortho-

1 photos, that the line in fact is not very near the
2 potential fishing area, but is, in fact, a mile
3 downstream or something like that. Then, of course,
4 with that added information, it would immediately
5 reflect on the recommendation, on the initial
6 recommendation. So that is really the process here
7 and the reason that some of these have not been
8 accepted is that in fact adequate information regarding
9 the recommendation, regarding actual site specifics
10 is not available right now.

11 Q But it does appear that
12 two have been approved and incorporated --

13 A I believe that there
14 are four --

15 Q Three others have been
16 approved, although not yet incorporated --

17 A I see in my table
18 three that have been approved and incorporated and
19 a couple of others, I believe one or two others that
20 have been approved but not incorporated.

21 Q And fifteen others
22 are still under review?

23 A That is right.

24 A lot of these are also in reference to the comments
25 made by the biological consultants as a result of
26 their review of borrow area locations and in some
27 respect the pending, in this particular case, is
28 really pending a review of our entire borrow requirements
29 and borrow sites.

30 Q But it appears that you

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1 are in a similar situation to that of Arctic Gas
2 where the route was located tentatively and then
3 subjected to your various recommendations on environ-
4 mental grounds ?

5 A Our route location
6 was selected to give us a base point to work from
7 rather than giving us a 20 mile or a 30 mile wide
8 corridor and saying, "Okay, biologists, you locate
9 the route for us within that 20 or 30 mile corridor",
10 which would just be an impossibility from a biological
11 point of view. You simply can't do that.
12 We might, for instance, locate the route on the top
13 of the Norman Range, which I am sure the engineers
14 wouldn't particularly care for.

15 Q Now, on page 7 of
16 your evidence in the third complete paragraph, you
17 stated that field studies have enabled the biologist
18 to become more familiar with the project area .
19 Now, I have got four items here, and I invite
20 the environmental consultants to tell me which, if
21 any, of these four things were done in /^{these} studies.
22 Number one is reconnaissance, and you might want to
23 put these down and just comment on each one of them
24 as I go through the consultants. Two, detailed
25 surveys; three, population studies; four, experimental
26 studies.

27 Mr. Kondla, how does your
28 reconnaissance or your becoming familiar with the
29 area fit into those four categories?

30 WITNESS KONDLA: I wasn't

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1 involved in this summer's field program at all,
2 however, I am generally familiar with the area from
3 work on the Mackenzie Highway.

4 Q Okay, Mr. Hayden?

5 WITNESS HAYDEN: Most of
6 our work this summer was in your first category
7 reconnaissance and site specific analysis of various
8 crossing sites on the water courses. We did a small
9 amount of detail surveys on specific locations.
10 Population studies, we really haven't done the sort
11 of thing that Aquatic Environment has done or that
12 Fisheries and Marine Service has done relative to
13 that. In some situations if we think the information
14 base is inadequate we would be doing that sort of
15 thing in the future and we haven't really done
16 experimental studies. We have considered some for
17 the future again there.

18 Q Yes, Dr. Finney?

19 WITNESS FINNEY: I think
20 that the studies would fall under the general
21 headings of reconnaissance, mostly again of site
22 specific -- of a site specific nature, and there
23 were some detailed surveys as well.

24 Q But no population
25 studies or experimental studies to date?

26 A I don't quite know
27 what you mean by "population" study.

28 Q Well, we have from
29 Dr. Gunn, for example, estimates that he appears to
30 have made on the population of snow geese that migrate

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to the North Slope area to stage. He seems to --

A All right. He has an estimate of the size of the population of snow geese each year.

Q Yes.

A He got that through detailed surveys or reconnaissance.

Q Yes.

A And so I am just having a little bit of trouble in separating the method from the type of data he collects. Certainly, I have some estimates on the population of waterfowl in different areas for the one year that I have looked at.

Q Would you agree, and he went over various years and times when there had been a good crop of young and years when there had been almost no crop of young. I gather, to turn your detailed survey into a population study you need a series of years, differing amounts of years for different populations or different species, perhaps, but it needs more than one year to give you an idea of the population dynamics of, say, the snow geese?

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1 A Well, there are very
2 of
3 few waterfowl in which you have birds of any type that you
4 have the luxury of being able to get that information
5 without becoming very detailed because in most birds
6 you can't tell the young of the year from the other
7 birds in the fall. With snow geese it's easy. Young
8 snow geese are gray. Adult snow geese are white so it
9 stands out for you. I think it's important that you
10 be able, therefore, for the species it's important to
11 be able to assess the productivity in any given year.
12 You can do this by having birds in the hand if you
13 set up traps, etc., and ideally it's better to have
14 it over a series of years as well to give you some
15 idea of fluctuation, certainly.

16 Q I'm not faulting you,
17 I'm just trying to find out where you are.

18 A I don't feel you're
19 faulting me.

20 Q O.K., Dr. Whitney?

21 WITNESS WHITNEY: Now I
22 assume that you're talking about in our last summer's
23 field program whether we've done these things or not,
24 whether we planned -- what we planned to do in future
25 programs.

26 Q Yes, I'm interested in
27 knowing where you are. You may also want to say what
28 you plan to do in the future and that would be helpful
29 as well.

30 A I think that that might
be worthwhile to put things in perspective, if you

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1 want to go through again and ask people what they
2 were planning to do in the future, if you like.

3 During the past summer
4 reconnaissance, of course, was a major portion of the
5 field program. Detailed surveys, population studies
6 and experimental studies, I have the same problem in
7 trying to draw the line between these, because I think
8 it's somewhat of a gradient and I'd have the same
9 problem as Dr. Finney; but I feel that we have conducted
10 or we have started a program of detailed surveys on
11 woodland caribou and bison. As far as population
12 studies are concerned, I think, as I said yesterday
13 these would be involved with trying to determine
14 such things as age structures of populations. One
15 reason that we would want to do this is try to evaluate
16 whether wood bison in the Mackenzie bison sanctuary
17 are in fact increasing in numbers. I think this is
18 a problem that Dr. Calef was concerned with, and we
19 have been talking with him about possibly sharing
20 information. Now this hasn't become a formal thing.
21 It's something that we would like to do but he has
22 expressed interest, and Mr. Jacobson has expressed
23 interest in trying to work together on this wood
24 bison population and see if in fact the numbers are
25 increasing. So I would say there we have started
26 population studies.

27 Experimental studies, I think
28 this is a very important part of environmental impact
29 because this is where, probably the only place where
30 the biologist has or can try to be objective in his

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1 experimentation. We have planned in the program that
2 we've started, to do experimental studies in relation to
3 bison and woodland caribou between the Red Knight
4 Hills and Yellowknife in relation to highway and
5 highway clearing of snow off the highway and berms
6 along the highway, and we're concerned that animals are
7 crossing or not crossing, and our first survey, there
8 was very little snow and so we didn't have the chance
9 to try to follow this up. But on our next surveys we
10 are going to try to be opening places in this berm
11 and seeing if animal tracks, have a control of a certain
12 section of road, and then we'll be trying to open the
13 berms along this road and see if animals in fact use
14 those berms.

15 So while we haven't started
16 that, it is definitely a part of the field program
17 that we have initiated anyway, an idea that this will
18 be somewhat of an experiment that we're going to try
19 along that road.

20 Q Now you've referred
21 to woodland caribou and bison, and I'm wondering
22 in light of the cross-examination that Mr. Scott went
23 through with Mr. Jakimchuk, whether you are considering
24 doing any work on the Bluenose caribou herd?

25 A No, I think that --
26 well, we've started surveys in the area where the
27 woodland -- I mean where the woodland caribou; let's
28 say the Bluenose herd was noted, and we have planned,
29 I advised Foothills that I think that this is a very
30 important area and we have planned and we have under-

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1 taken detailed surveys of this particular area.
2 Now this is something that we are concerned about to
3 the point that we are going to survey in that area, what
4 we hope is on a regular basis. But as far as conducting
5 a program on the Bluenose herd to the extent that has
6 been conducted on the Porcupine herd, I would say that
7 we have not considered that at this time and we would
8 rely heavily on the survey material that has been gath-
9 ered on the Bluenose herd by the Canadian Wildlife
10 Service.

11 Q You would agree, though,
12 that the facility may come in conflict with either
13 wintering range or potential wintering range between
14 Travilliant Lake and Fort Good Hope?

15 A Yes, this is the area
16 where we have been trying to concentrate our surveys,
17 I would say within a line 50 miles either side of the
18 line.

WITNESS BOUCKHOUT:

19 You are aware, of course,
20 Mr. Bayly, that the Canadian Wildlife Service has
21 instituted a study of the Bluenose caribou herd and
22 is continuing that, and we're going to certainly make
23 full use of their information with regards to their
24 study of the Bluenose herd, and continue with our own
25 studies in that particular area relative to our general
26 line location. Then of course, if the Bluenose herd did
27 come in contact with that location or began to over-
28 winter in that area it would certainly be picked up both
29 with the Canadian Wildlife Service studies and surveys
30 as well as with our own.

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1
2 Q They have passed the
3 study onto you, have they, Mr. Bouckhout?

4 A No, they have not passed
5 the study onto us, no.

6 Q All right, but you have
7 an indication or Dr. Whitney has an indication that
8 they intend to co-operate in this area. Is that correct,
9 Dr. Whitney?

10 WITNESS WHITNEY: I assume
11 that if and when this material is written up that we
12 will have access to it.

13 Q Now, one of the other
14 concerns we have is with regard to the reindeer herd
15 with which the pipeline facility may, and certainly
16 the processing plants and feeder lines are very likely
17 to come in conflict, and have you done any studies
18 or surveys of the reindeer herd? Or do you plan to
19 do any?

20 A Now this is something
21 that I find confusing and that is exactly what the
22 difference between a reindeer, a woodland caribou,
23 a barren ground caribou, and some people I've talked
24 to say, "Oh, you can tell the difference, that's easy."

25 Q Let me define it for you
26 just in this way. There is a herd of animals that may
27 look like caribou, but they're actually being herded
28 by people from Tuktoyaktuk and a portion of them is
29 being slaughtered and marketed each year. The herd is
30 fairly well defined and it is moved from one area to

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another. Does that define the population I'm concerned with in this question for you?

A That's better. I'm trying to get back to your point. I would say we have not planned to do detailed studies of that reindeer herd but I'm sure that as we move into final design that if there has been native people or the people concerned feel that there can be something done in relation with Foothills, well, I think that something should be done and I feel that Foothills will try to work something out with them.

Q All right. Well let me just put this to you as a hypothetical possibility that has come out from evidence that we have heard so far. There is an indication in cross-examination that the Bluenose herd may be increasing in size. We know the alignment of the Foothills facility and we know the location of some of the gas plants. One of the problems with the reindeer herd may be access to range and in order that they not be absorbed by the Bluenose herd at some point, and in order that they can still be farmed, if you will, as a viable economic operation, they may be looking very hard to find sufficient range to keep this population healthy and economically viable. Is that a concern that you could appreciate as a possibility?

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A No, I think that is a very astute observation that I am sorry that I hadn't thought of.

Q It is a possibility that you can appreciate?

A I can certainly appreciate it, and what the probability or what the possibilities are of that I would have to think about it in more detail, but as I understand it now, that most of the herding is done in the Delta area, and the Bluenose caribou herd is, the wintering area that we are talking about is Fort Good Hope and I am not exactly sure what the differential in mileage there, but I would say that there would be 120 miles, maybe more, and I know that caribou are unpredictable in where they are going to be going and what patterns they are going to be using. Now, whether it would be probable at all that they would move 120, 150 miles to usurp range used, say, in the Parsons Lake area, ^{that} ~~was~~ overwintering for reindeer, I really hadn't considered, I guess, it was just too far away, but now that you bring it up I think that it is something worth considering.

Q Perhaps if you do get a chance to consider it and have some opinions on it, those might be passed on to us, should the Inquiry be going on at the time that you have had some time to think about it.

MR. MARSHALL: Mr. Commissioner, Mr. Bayly has raised a point a few minutes ago

1 that is of some interest to my clients, and that is
2 with respect to work that the Canadian Wildlife
3 Service is doing on the Bluenose herd. We'd
4 like to formally request, sir, that the Canadian
5 Wildlife Service make available to Arctic Gas
6 consultants, the information that they have obtained
7 in their studies of the Bluenose herd, and if pos-
8 sible we would like to have that information provided
9 before the reports are finalized, as I gather that
10 it may be some time before that is done. If they
11 have census data and distribution data, migration
12 data that is presently available, we would ask that
13 that be made available to our consultants.

14 MR. BAYLY: I think we would
15 all like to see that if it is available, sir.

16 MR. SCOTT: Mr. Commissioner,
17 the Wildlife Service isn't present, of course, and
18 can't speak to it and the routine for contacting
19 officials of the Wildlife Service to interview them
20 and to obtain their information has already been
21 laid down, and some of the participants have taken
22 advantage of that and I am sure that my friends will
23 if they want to meet people in the Wildlife Service.
24 There is no formal report on the Bluenose herd. Some
25 work has been done and there may be a draft report
26 in existence, and I will try to see if that can be
27 found, but the way to deal with the Wildlife Service
28 is to follow the procedure that was laid down pursuant
29 to our arrangement with the Minister of the Environ-
30 ment, and I know that my friends will want to do that

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1 in every possible case. But I will try and get that
2 report as long as it is not understood -- or as long
3 as it is understood that I don't have really any
4 access other than my friends have and I don't repre-
5 sent the Wildlife Service.

6 MR. MARSHALL: We know that
7 you will do your best for us, Mr. Scott.

8 MR. BAYLY: Mr. Commissioner,
9 I understand --

10 MR. SCOTT: You had trouble
11 getting that out.

12 MR. MARSHALL: I gagged on the
13 words.

14 THE COMMISSIONER: Come on,
15 let's get --

16 MR. BAYLY: I understand,
17 sir, from Ms. Allison, that the contact person that
18 we have from the Canadian Wildlife Service is no
19 longer with them and perhaps Mr. Scott could supply
20 us with a new name. -- Oh, sorry, the Department
21 of the Environment, not the Canadian Wildlife Service.

22 MR. SCOTT: Mr. Etoch
23 who was the contact man whose name I announced has
24 been replaced by Dr. Lawler at Winnipeg.
25 I understand from Dr. Fyles that they can write and
26 contact the same office that we notified them of
27 before and the arrangements will be made in the
28 usual way.

29 MR. BAYLY: Now, before
30 we leave this question that I began with, Dr.
Whitney has had the advantage over the rest of the

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1 consultants of being able to say what he plans to do
2 in the future and it may be that the other consultants
3 would like to have the same advantage. Dr. Finney?

4 WITNESS FINNEY: Well,
5 we plan to gather primarily much more data on the
6 Yellowknife/Pine Point lateral. This will include
7 spring, summer and fall waterfowl surveys, it is
8 largely aerial reconnaissance. In spring we are
9 looking for summer -- or spring migration and then
10 we do breeding bird surveys during the summer and
11 then in the fall we are doing again fall migration
12 surveys. In addition to this we will be doing --
13 setting up ground transects, monitoring particularly
14 shorebird migrations. We plan to extend that along
15 the main line as well, because I feel, anyway, that
16 shorebird migration has been neglected.

17 Then we plan to do breeding
18 bird surveys, transects along the Yellowknife lateral.
19 This is not like aerial waterfowl. This is land
20 transects. Those are just general types of collecting
21 information on populations, population densities,
22 species composition, habitat utilization, etc.

23 In addition to that we are
24 concerned with specific problems, a particular example
25 might be disturbance by barging, which we plan to look
26 at. I don't think that I need to go into details
27 of the studies in any greater extent. That gives you
28 a general idea of the way we are thinking .

29 Q Have you chosen your
30 sites yet, Dr. Finney? Where you will be doing these,

1 or is that something that still has to be done over
2 the winter?

3 A Well, actually I talked
4 to my assistants last Saturday on break, but we
5 didn't get it finished and I plan to do that very
6 shortly, but I haven't had time to get at it.

7 Q You would be antici-
8 pating doing that in the next month or so then?

9 A Yes.

10 Q Mr. Hayden?

11 WITNESS HAYDEN: I think
12 as I indicated in my prepared evidence that we feel
13 that the winter ecology of many species is inadequately
14 known now and that is perhaps one of the biggest
15 deficiencies, and so I think maybe this would be
16 categorized as detail type surveys that were going
17 to be trying to locate. It is sort of a mixture, I guess
18 between reconnaissance and detailed surveys, to locate
19 overwintering areas by doing samplings at river mouths
20 in the winter and hopefully, in the Mackenzie itself
21 to try and locate the various white fish species,
22 the fall spawning fish primarily, where they are,
23 so that we will have confidence that they can be
24 avoided.

25 When, I guess, perhaps
26 duringg final design, when campsites are being located,
27 and this sort of thing, we will of course be doing
28 detailed surveys on the water withdrawal areas to
29 make sure that fish populations won't be impacted by
30 water withdrawal.

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1 As far as experimental work
2 goes, an example of that sort of thing may be that
3 we are considering a winter siltation study since
4 construction is to occur during the winter. We are
5 interested in the behaviour of suspended sediments and
6 the effect of suspended sediments during that period,
7 and as far as I know, really no work has been done
8 on a winter siltation experiment, so that is a possi -
9 bility, we may do that.

10 Q Have you chosen your
11 location for that type of experiment?

12 A Well, obviously it has
13 to be a stream that has winter flow and we've
14 considered something, we haven't made a definite
15 choice, something like Hodgson Creek and
16 certain areas may be a location for that. I think
17 we look at the aquatic systems and sort of -- for
18 physiographic zones, generally, and we may, in fact,
19 try to find something representative in each one
20 of those zones that does have winter flow.

21 Q Now, you have referred to
22 a problem that we raised with Dr. McCart, and that
23 is that there is very little known about certain
24 species of fish with regard to their overwintering
25 and you've mentioned white fish as one of them, and
26 I would invite you to agree that some of the other
27 species about which little is known in the area that
28 you will be working are the coney do you agree
29 with that?

30 A I would agree, yes.

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1 Q The herring?

2 A Yes, in the Delta area.

3 Q Yes. The loche?

4 A That is bergut, I

5 take it?

6 Q Yes.

7 A Yes.

8 Q And the inconnu?

9 A That is the same

10 as the coney I take it that it is the same as the

11 conni.

12 Q Now, I understand them
13 to be two different species, but I am probably not in
14 a position to debate it with you.

15 Okay, I have been informed
16 that they are the same, so --

17 Those are species about
18 which overwintering areas and spawning beds have in
19 general not been located?

20 A I think probably more
21 is known about Arctic char and Arctic grayling than
22 any other species on the alignment or in the Mackenzie
23 Valley proper.

24 Q All right.

25 A The fall spawning fish
26 are of course of greatest concern because of the
27 reasons that Dr. McCart talked about previously.

28 Q And you did considerable
29 work in Alberta in what is referred to as brown water
30 streams, so this is an area in which you are familiar?

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1 A Yes, that is correct.

2 Q Yes, and are there areas
3 where you have any agreements with the government that
4 they will do the studies rather than you, similar to
5 the agreement that appeared to exist between Arctic
6 Gas and Fisheries?

7 A We've been attempting to
8 co-ordinate with Federal Fisheries, particularly on
9 the Yellowknife lateral, where we want to do some
10 detailed site specific surveys of the various streams
11 that will be crossed by the Yellowknife-Pine Point
12 lateral. The Federal Fisheries is planning to do
13 a certain amount of creole census work in that area,
14 so we'll be working sort of together and co-ordinating
15 that information. We want to avoid duplication of
16 effort all we can.

17 They have also done some
18 tagging work in some of the tributary rivers to
19 Great Slave Lake and we'll be attempting that. I
20 think that's probably the best example in the Yellow-
21 knife-Pine Point area.

22 Q Would you agree with
23 Dr. McCart that they are a more difficult species to
24 study because of the fact that you can't see them in
25 the water and because they're more difficult to handle
26 physically? They seem to be more fragile.

27 A You mean fish are more
28 difficult to study?

29 Q Yes.

30 A Well, I think the fact

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1 that you can't see them does make some difficulty in
2 -- I think all of us are reluctant to do a lot of
3 lethal sampling. We like to do non-lethal sampling as
4 much as we can. I think there are some advantages
5 in sampling fish, I guess the extent of their
6 distribution is restricted, of course, by water. I
7 have personally a preference to working with fish
8 certainly. I don't know how -- I'm a little reluctant
9 to agree entirely that they are extremely fragile.
10 I think if properly done they are less fragile than --

11 Q I understand that the
12 coney, for example, sheds its scales if you handle it.
13 Is that something you're familiar with?

14 A Well, I think generally
15 whitefish species and the whitefish group, the coregonid
16 do tend to shed scales and you have to handle them
17 rather carefully.

18 Q That makes them a little
19 more difficult to handle than Arctic char or grayling
20 that don't exhibit that characteristic, I understand.

21 A You have to be careful
22 for that, yes.

23 Q Now you've referred to
24 lethal sampling and as I understand Arctic Gas has
25 studies on grayling and Arctic char; they don't do
26 lethal sampling and I gather what you mean by that is
27 you poison some fish so that they come up to the sur-
28 face so that you can find them, or you catch them in
29 a net in which they are killed.

30 A The Federal Fisheries

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1 is adverse to poisoning, we don't do that, our
2 collecting permits do not allow poisoning. The lethal
3 sampling I was referring to is gill-netting mainly
4 which is often lethal, ^{in the winter} especially with the whitefish
5 species, they don't last long in nets, they die quite
6 quickly. Non-lethal sampling is shocking, trapping
7 them with fish fences, this sort of thing. I think
8 first we try to sample in a non-lethal manner, and if
9 that is not successful then we're forced into situations
10 where we are using gill-nets. Usually in lake sampling
11 we're not given much choice other than gill-netting.

12 Q Now when you say that
13 Fisheries doesn't like the idea of poisoning the fish,
14 do you feel the same way about it, and would you anti-
15 cipate using this technique if you were able to get
16 permission?

17 A Personally I don't like
18 to poison fish either. I would prefer to use almost
19 any other method. For example, this last summer we
20 found often that angling, which is enjoyable, of course,
21 but was also a very effective method to catch sample
22 fish. So we would do that. Some of the fish that
23 incidentally we --

24 Q I should become a fish
25 biologist.

26 A -- some of the fish that
27 we did catch were by angling and by shocking, which are
28 two non-lethal means we would sacrifice to age and to
29 judge maceration and this sort of thing. But the
30 number of fish that we were allowed to kill is restricted

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1 to a Federal Fisheries permit.

2 Q And I gather one of the
3 problems with using poisons -- and it is done, I gather,
4 to study fish -- is that if you do it in a stream it's
5 very difficult to know how big an area downstream you
6 are affecting.

7 A That's true. Usually most
8 fish poisons have an affect on the aquatic invertebrates
9 in the stream, and so it's sort of a non-discriminate
10 sampling method.

11 Q Yes. From that I gather
12 you'd be prepared to say you wouldn't be using that
13 method.

14 A Poisoning?

15 Q Yes.

16 A No, I don't anticipate
17 using that method at all.

18 Q Mr. Kondla, are there
19 studies that you intend to undertake that you could
20 tell us about? And I'm referring to ones that haven't
21 been referred to in direct evidence or in the appli-
22 cation.

23 WITNESS KONDLA: Yes, I do
24 expect to do a number of studies. Two areas that we
25 right now don't know very much about the vegetation
26 on are the area between Fort Good Hope and the Inuvik
27 area. For some reason the people that have been studying
28 the vegetation in the Mackenzie Valley over the last
29 three or four years have avoided that area, at least
30 it seems that way to me, and of course the information

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1 base on the Yellowknife lateral is insufficient at this
2 time, so we'll be doing some reconnaissance type
3 studies probably in those two areas and selected areas
4 on detailed surveys. Now these reconnaissance studies
5 and detailed surveys will overlap to some extent. The
6 primary areas where I would envisage detailed
7 surveys would be identified through the reconnaissance
8 studies and here I'm thinking particularly about rare
9 and uncommon vegetation types. An example would be in
10 a large area of a very monotonous boreal forest,
11 occasionally you'll find calcarius springs, this kind
12 of thing, and the vegetation growing in these areas
13 is quite unique and on an areal basis is quite rare
14 and uncommon in these areas, so we hope to pick those
15 kinds of occurrences up through the reconnaissance
16 program and then where necessary, if there seems to
17 be some conflict with the pipeline project, we would
18 want to do some detailed surveys in these areas to
19 identify the magnitude of the problem.

20 I can't foresee any population
21 studies on vegetation or on plants, pardon me, but
22 some experimental studies, I think, should be under-
23 taken, primarily concerning the issue of drainage
24 disruption. Drainage disruption both surface and sub-
25 surface have been talked about to a large degree by
26 everybody concerned about the environment in the
27 Arctic for the last four or five years, and surprisingly
28 enough, we just don't have any solid information on
29 just exactly what the effects of drainage disruptions
30 are. So I think this is a very important area for

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1 further research.

2 Q And with regard to the
3 area between Fort Good Hope and the edge of the trees
4 close to the terminus, the northern terminus of your
5 line, I gather there's a forested area there that, if
6 you cut it down, it may well not come back to the same
7 thing. We may never have that spruce forest re-grow
8 again.

9 A If you're talking about
10 the area east of the Mackenzie Delta, that is a
11 possibility. If you assume that there are no or further
12 forest fires or tundra fires, whatever the case may
13 be, in other words if you just remove the trees from
14 a narrow strip through that area right now and if there
15 are no fires, then yes, it is quite unlikely that the
16 nature of that cleared strip would over time revert
17 to the same characteristics as the surrounding area.
18 However, because fires are so abundant up there, I
19 think fire would be the great equalizer in terms of
20 ensuring that vegetation in the cleared area and the
21 uncleared area over a long period of time would become
22 rather homogenous.

23 Q All right. I gather,
24 though, that you'd have to discuss this with the
25 engineers. They're probably not going to want to encour-
26 age forest fires over the right-of-way.

27 A No, I'm not at this point
28 suggesting that that would be used as a management tool,
29 although I think it's theoretically an idea that
30 should be pursued by somebody.

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1 Q You're talking, I assume,
2 after abandonment as perhaps a technique.

3 A Yes. It doesn't necessar-
4 ily have to be used as a conscious managem ent tool;
5 because fires occur naturally I think that given a
6 long enough time span this kind of thing would happen
7 naturally without any conscious effort on our part.

8 Q Yes. Now on page 18
9 of your evidence, you referred to the process of a
10 multi-disciplinary team of biologists, and are we
11 looking at that team here or are there other disciplines
12 involved in this process that are not represented
13 here? Mr. Bouckhout, perhaps you could respond to
14 that.

15 WITNESS BOUCKHOUT: Well, I'm
16 just presently looking for the actual quote.

17 Q The third full paragraph,
18 page 18, starting,
19 "During July."

20 A Part of that team is
21 represented here. I believe Dr. Finney and Mr. Hayden
22 took part in some of those studies. There are other
23 individuals who did take parte in this process who are
24 not here today.

25 Q Now, what sort of a
26 method did you use? Was it a round-table discussion
27 method that has been described by Dr. Banfield, or did
28 you use the matrix kind of system that has been des-
29 cribed by Mr. Templeton, or a combination of these or
30 something quite different?

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1 A Well, we certainly didn't
2 use the matrix format. I think it was generally more
3 allied to a discussion of the issues involved in the
4 fields in particular. Perhaps Dr. Whitney could advance
5 that a bit further.

6 WITNESS WHITNEY: I think Mr.
7 Bouckhout meant Mr. Hayden and Dr. Whitney, instead
8 of Dr. Finney.

9 WITNESS BOUCKHOUT: Sorry.

10 WITNESS WHITNEY: O.K. Now
11 the thing that you are actually concerned about is
12 whether we used some -- whether we attempted in any
13 way to make our subject process, admittedly subjective
14 process more objective, whether we used some ^{sort of} map over-
15 lay system, computer model, or one of the many things
16 that appear in the literature for weighing these
17 matters back and forth between the environmental people
18 and the engineering people.

1 Q That is correct.

2 A Is that what you are
3 trying to get at?

4 Q No.

5 A All right.

6 I would say that the
7 group discussion is the method that we used.

8 Q All right, would you
9 see in the future the possibility of using other or
10 additional techniques in order to perhaps further
11 objectify the conclusions that you come to?

12 A Well, I don't think that
13 I am so old that I cannot learn new tricks, but
14 I have been looking for a technique that reduces
15 subjectivity and I feel now that I am not aware of
16 one that I am satisfied with that beats just, a good
17 old bull session, talking these things and throwing
18 them back and forth.

19 Lombard North has used map
20 overlay systems, computer models for identifying these
21 sorts of things, so we certainly have these tools,
22 but I think that, in many ways their main advantage is
23 in their heuristic value and that is just the
24 process of doing an identification rather than an
25 actual problem solving sort of thing.

26 Q So you say that they
27 are more illustrative than helpful in forming your --

28 A I think that they have
29 a certain advantage, but I haven't found one that I
30 felt that would supplement us significantly, and here

1 comes the word 'significantly', it is a very suggestive
2 thing and we haven't use it.

3 WITNESS BOUCKHOUT: There
4 are many ways, Mr. Bayly, described in the literature
5 of course, to use your term, to more objectify the
6 type of information one might collect, in other words,
7 to get away from the subjective -- and each of these,
8 having been described, has been countered with an
9 argument against it and it is very difficult to
10 appreciate -- to objectify information. Collected
11 data, per se, of course, is as objective as it can
12 be, but it is subject to your initial design of your
13 experiment or of your data collection methods and
14 so on and really I think that a lot of biologists,
15 having used these various types of methods with
16 various pros and cons really often come back to a
17 more grass roots biological approach.

18 Q All right, do you use
19 the ones that are already there? The Environment
20 Protection Board has provided one. It was on the
21 scene before, late in 1974 when you began your
22 studies. Was it something that you looked at as
23 a team, as part of your becoming familiar with the
24 state of the knowledge of the corridor in which you
25 intended to put the pipeline?

26 A As a team when we pre-
27 pared the Environmental Statement, we certainly re-
28 viewed the Environment Protection Board's reports and
29 their matrix format. Having done that we decided
30 that, for our purposes, since that had been done as an

1 exercise, and really it is an exercise to allow
2 one to visualize the types of interactions that are
3 possible. I believe they came up with something in
4 the order of 6,000 or more than 6,000 and as such
5 to follow that up, of course, one would look at each
6 of these 6,000 possible interactions and comment on
7 it, or design an experiment for it, or collect
8 data relative to those types of interactions, and
9 you will appreciate that a number of those 6,000 you
10 would immediately write off as not being particularly
11 important, or not being particularly applicable to the
12 type of project that we were dealing with.

13 Having assessed the matrix
14 format and having it already available, we decided,
15 when we began the work for the environmental statement,
16 this was not the direction we cared to go since there
17 was already a matrix available which we could use
18 whenever necessary and could possibly use for further
19 work.

20 Q And did you find the
21 problem that Mr. Templeton referred to in several of
22 his appearances here, that is, that biologists from
23 different disciplines may speak, I think he calls
24 it different languages, but certainly use different
25 terms and different ways when they are expressing
26 themselves and you might be in a position to know
27 that.

28 A Oh, yes, that is certainly
29 a possibility, and not only that, but a Fisheries
30 biologist, take the example where there is a trade off

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1 between a fisheries concern and, say, a mammal concern;
2 the fisheries biologists, having worked with fish
3 for a long time and having gotten some sort of deep
4 interest in the topic area of aquatic environments,
5 might represent his case very strongly with regards
6 to fish, and the mammal man, of course, would repre-
7 sent his case very strongly with regards to mammals.
8 It is simply a personal preference. If I worked on
9 mule deer for 20 years and somebody was going to
10 drive a highway through my mule deer range where I was
11 continuing studies, or had done studies and had some
12 sort of an affinity for that particular area, I would
13 be a little upset and I would probably represent
14 my concern fairly vehemently. It is very difficult
15 to really be totally objective when you are dealing
16 with people, and there really, I don't think is any
17 way. Of course, come people try to use a matrix
18 system, use an assignment of, oh, rating assignments
19 to various aspects, to various conflicts or con-
20 cerns. This is one method of getting at it, a
21 very difficult method, and again it is right back
22 into the subjective zone of who rates. If you have
23 one man from the outside who is not particularly
24 involved in any one particular discipline, in other
25 words, a man who is a general biologist beyond
26 being a specific fish man or a specific mammal man,
27 he possibly can do a more objective job of generally
28 rating everything than could the individuals within
29 their own disciplines.

30 Q I take it that you

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1 also face the kind of problem if, say, Mr. Kondla
2 makes a particularly impassioned and eloquent plea
3 for the dryas and integrefolians that may sweep you
4 along in the face of the fact that Mr. Hayden is
5 not a talkative person, if we could use that as a
6 possible example.

7 A Well, certainly, that
8 is always part of it, and the role I play with
9 Foothills, I attempt to evaluate all of the various
10 inputes from the various disciplinary people and
11 also in regards to the project as a whole and
12 attempt to sort out priorities and so on and certainly
13 it is based on the priorities that are expressed by
14 our biological consultants.

15 Q And you have the
16 same problem, I take it, not just with the biologists,
17 but having the biologists speaking with the engineers
18 and the soils people, etc.?

19 A I would say^{to}/that, Mr.
20 Bayly, that I really think everyone has that problem,
21 including yourself possibly here and the Inquiry in
22 general . It is very difficult and if someone can
23 come up with some foolproof scheme to make these
24 tradeoffs, and make the best tradeoff possible without
25 making any or very many mistakes, we'd certainly
26 be interested in hearing it.

27 Q Dr. Finney, I think that
28 you want to say something.

29 WITNESS FINNEY: I don't
30 know if it is particularly relevant or not, but I think

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1 we have quite rightly emphasized the importance of
2 subjectivity, because along the line you run into
3 it eventually, and perhaps I should indicate the
4 difference between a biologist doing the assessment
5 and the person off the street in Toronto who has
6 no knowledge of biology, who perhaps could come up
7 with a subjective judgment as well, just as an
8 example.

9 At some point along the
10 line, you ultimately come to the point where you don't
11 have any more data, and at that point you make your
12 subjective judgment. You try to get as far along that
13 line as possible and collect the data as objectively
14 as possible and that it is unbiased. For an example,
15 with disturbance to aircraft and snowgeese that
16 Dr. Gunn investigated. At one point he would have
17 speculated and his best judgment would have been
18 perhaps that aircraft are going to distress snow
19 geese but he didn't have any proof for it, so that
20 was his subjective opinion. He went on and advanced
21 it one step further and came up with the fact, the
22 documented fact that snow geese were upset by aircraft
23 at these heights and at this frequency, etc., so he
24 is one step down the line.

25 Now, if somebody asked him
26 the question, is this actually distressing the
27 geese in that it is causing them hormonal stress,
28 physiological stress, etc., why he has attempted to
29 get physiological stress, if you asked him the question
30 on hormone stress I think he would answer and everybody

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1 else would have to answer because it is the state of
2 the art that their subjective opinions would be
3 yes, it will, or no, it won't, and I am just trying
4 to indicate that at some point along the line you
5 always face the barrier where you have to come up
6 with an opinion and the thing that we are all attempting
7 to do is go as far down the line as possible.

8 WITNESS KONDLA: Could I make
9 a comment here?

10 Q Certainly.

11 A I think that we are
12 getting into an area of value judgments, on talk about
13 subjectivity versus objectivity, and I have got in
14 front of me a paper that I think would be of benefit
15 to just about everybody at this Inquiry to read at
16 some time, preferably quite soon and it is entitled
17 "Parameters for Ecosystem Evaluation." It is authored
18 by Drs. Chant and Clouter, and it is published by
19 Environment Canada under the title of "Planning and
20 Finance Service, Occasional Paper No. 1", and they
21 pursued the possibility of evaluating ecosystems
22 through objective criteria rather than subjective
23 criteria and I don't know just exactly how relevant
24 this is, but I would just like to read a couple
25 of sentences here. From the authors' summary and
26 conclusions they say:

27 "We have become convinced that this
28 attempt at a fully rational approach
29 to the question of ecosystem value is a
30 sterile one that could be applied in very

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1 dangerous and destructive ways. When all is
2 said and done, basic ecology will not help
3 with what essentially are political, social,
4 economic decisions regarding environmental
5 management, except to predict the consequen-
6 ces of actions and decisions and to set the
7 outer limits on stability and survival."

8 I think that this paper has got a lot of philosophical
9 meat in it which we could all profit by in terms
10 of considering objectivity versus subjectivity.

11 Q And you are suggesting --

12 THE COMMISSIONER: I think
13 Mr. Bayly, that I should say that I would like to
14 read that paper --

15 MR. LUTES: I will make
16 it available.

17 THE COMMISSIONER: Yes, and
18 Dr. Finney, I think you explained very lucidly the
19 difference between a subjective judgment in this
20 field and one that is supported by supposedly
21 objective data. Well, I think that we will stop
22 for coffee now.

23 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)
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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. BAYLY: Q Gentlemen,
where we left off at coffee time, appeared to be the
point where Dr. Finney was saying that there was a
point beyond which you cannot go objectively and that
many of your judgments which you pass onto the appli-
cant will be subjective ones. I invite you to
agree with me that that is not necessarily a bad
thing because the only accurate way, for example, to
predict the destruction of a population of fish or
snow geese or caribou might be to actually destroy
them. So that might be objective but it might not
be something we'd like to see. I believe that is
where Mr. Kondla left us when he raised the spectre
of entirely objective judgments. Would that be fair
to say, Mr. Kondla?

WITNESS KONDLA: Yes, I
certainly agree there is a certain amount of danger in
being too objective about these things.

Q All right, and for
example, if we were being completely objective about
this pipeline, the only consideration we would have to
make would be the shortest distance between the supply
of gas and the consumer, and whether the engineers
could put it into the ground and across the rivers.
Do you agree with that?

A If we chose to ignore
the environment, that would be true, yes.

Q Yes.

WITNESS BOUCKHOUT: And we

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1 chose to ignore the geotechnical constraints and what-
2 not.

3 Q Yes.

4 THE COMMISSIONER: And the
5 people.

6 MR. BAYLY:

7 Q Yes, and that isn't
8 the path that either applicant has chosen and therefore
9 we are left with some disciplines which cannot supply
10 information of the same objectivity in areas where there
11 just isn't available or even isn't obtainable, given --
12 and particularly isn't obtainable within the time
13 frame that has been allotted, in this case, to Foothills.
14 Would you agree with that, Mr. Bouckhout?

15 A I didn't really follow
16 that. Sorry, Mr. Bayly. I was thinking of something
17 else.

18 Q Well; you're given a time
19 frame within which to gather baseline data, environmen-
20 tally, to do experiments, to do surveys, and to predict
21 impacts and to suggest ways of avoiding ^{and} /mitigating
22 these.

23 A There is a general time
24 frame available, yes.

25 Q All right, so you're
26 accepting that from your consultants you will get
27 judgments which are not necessarily based upon hard
28 data because in the time allowable it's not all obtain-
29 able.

30 A Well, I think most of
these judgments will be based on hard data. It's a

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1 matter of how much hard data, I think, is really what
2 you're getting at and in a lot of cases some subject
3 areas require a lot of time to collect data on a
4 variable system, or a variable topic, and anyone
5 dealing with natural systems realizes there is a
6 great degree of variability involved in natural
7 systems, inherent in natural systems, and you have to
8 take this into account when you're analyzing your data
9 and analyzing your circumstances.

10 Q Yes, and the interpreta-
11 tion of that data is an important factor too, how it
12 is done and this has to be evaluated by the consultants
13 and the applicants.

14 A Yes, not only the
15 interpretation of their own data but added to that
16 and utilized in that interpretation is a knowledge
17 and experience, ^{their} own individual experience as well as
18 experience of other investigators possibly in totally
19 different parts of the world or in different parts of
20 the country.

21 Q And it's for this reason
22 that you seek the co-operation, for example of the
23 Fisheries people and the Canadian Wildlife Service, so
24 that you can enlarge your data base and benefit from
25 the assessment of data that has been collected by
26 others.

27 A Yes, requisite you want
28 the most up-to-date and the greatest degree of data
29 available and you want the best advice available.
30

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1 Q All right, and I gather
2 from the questions that Mr. Hollingworth was asking
3 Dr. Gunn in the last panel that in certain instances
4 there's been some difficulty in collecting that co-
5 operation, in particular with regard to the raptor
6 nest locations.

7 A Well, I think there has
8 possibly been some difficulty, although it's not
9 necessarily a difficulty with regards to any individual.
10 It might be the kind of data you appreciate, the data
11 on actual site locations of peregrine falcon nests
12 is very priority related data which, you know, is not
13 generally disseminated.

14 Q Yes. I am assuming,
15 though, that if you could get that kind of data that
16 would avoid having to send Dr Finney on a reconnaissance
17 to find these things and possibly disturb birds more
18 than they have already been disturbed.

19 WITNESS FINNEY: May I answer
20 this?

21 Q Sure.

22 A I think that what I was
23 concerned about in the acquisition of data was a
24 number of things. One thing certainly is duplication
25 of effort, in that you're dealing with a rare and
26 endangered species and if I was to go out and duplicate
27 surveys that the Wildlife Service had done, and they
28 were in the same area doing surveys as well, then we
29 have twice as many helicopters flying ^{by}/essentially and
30 twice as much disturbance, and twice as much potential

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1 for damage. The second thing obviously, we cannot get
2 a historical view of this particular aspect, and I
3 maintain that this applies to a number of pieces of
4 information that government agencies might have, or
5 other people might have. I have no way by collecting
6 data in 1975, knowing what was happening during the
7 1950's, just by definition, and what was happening
8 in the 1950's might well be of relevance in that it
9 might indicate different patterns.

10 With the raptors I have one
11 further concern and that was accidental encounter by
12 Foothills field groups who weren't aware of specific
13 nest-sites and accidentally encountering them on their
14 drilling or fish studies, or whatever happened to be
15 going on in the area, and accidental disturbance in this
16 case I think is something that should be avoided.

17 Q Yes. Now I gather, Dr.
18 Whitney, that not with regard to co-operation but with
19 regard to actual information on certain species, we've
20 identified certain things that have not been studied
21 very much by anybody, and Mr. Hayden has agreed that
22 very little is known about overwintering areas of
23 certain fish, for example. I'd invite you to agree
24 that with regard to woodland caribou and their move-
25 ments, and habits in the Mackenzie Valley we may also
26 be faced with very little in the way of collected
27 data, reports, etc.

28 WITNESS WHITNEY: I think that
29 the woodland caribou have been largely overlooked because
30 they are a very rare animal and they're very difficult

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1 to study. I think that recently there have been two
2 thesis , one by Stardom -- Stardom worked in the^{Lake}/Winni-
3 peg area on woodland caribou, and another thesis by
4 Freddi on the Selkirk caribou herd in Southern British
5 Columbia, that have greatly increased our information
6 on general knowledge and habits of woodland caribou.
7 We've heard that a student of Dr. Pruitt's is currently
8 finishing another work on woodland caribou.

9 One thing that I was very
10 favorably impressed with, was the tremendous amount of
11 ancillary knowledge that has been collected by the
12 Canadian Wildlife Service, that is tucked away in
13 reports. Say you have a biologist's, recent report by
14 Mr. Templer of the Canadian Wildlife Service, and on the
15 title of that report it says:

16 "Migratory Waterfowl Surveys in the area of
17 Mills Lake,"

18 I think was the report. Now tucked away[/]in that report
19 -- and I don't know how it would be referenced -- they
20 kept track and for some reason, well, for a very good
21 reason, they kept track of the woodland caribou that they
22 spotted and had them located. Well, the more I looked
23 into this in the Canadian Wildlife Service Library,
24 the more sightings I saw of woodland caribou. Each one
25 of these studies of the Canadian Wildlife Service had
26 flown in the area of Mills Lake or in relation to the
27 Mackenzie Bison Sanctuary, or in relation to furbearer
28 studies in the area, notes and they seemed to be very
29 careful notes were taken of these woodland caribou.
30 I think that this just may be a goldmine of information

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1
2 that if somebody could pull of this together I was
3 hoping that we could pull all of this together out of
4 Canadian Wildlife Service Reports. It doesn't appear
5 to have been done. I think that Jacobson is also inter-
6 ested in doing this, but this is just hearsay, and we
7 certainly wouldn't want to scoop him, and that's not
8 the reason we would do it; but this information does
9 seem to be available, it does seem to be of a good
10 quality, and I don't think that it's fair to say that
11 the information has not been available. It's just that
12 I don't think it's been pulled together mainly because
13 they're a very rare animal.
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1 WITNESS BOUCKHOUT: If I could
2 just for a moment, Mr. Bayly put this information volume
3 issue into perspective and to do so I might use a
4 very extreme example just for illustrative purposes.
5 There are a number of subject areas which are
6 relevant to the Mackenzie Valley highway, or sorry,
7 the Mackenzie Valley, per se. But in regards to that
8 we really have to look at the information availability
9 and the information necessity, relative to the project
10 we are talking about. For instance, to use a very
11 extreme example, there is very little information
12 available on the population dynamics of black flies
13 or something like that, but you have to look at that
14 in perspective and say, well, is that really an
15 issue with regards to the gas pipeline; so that you
16 might say, well, here is an area where there is
17 very little information available, but do we really
18 need any information? So, you know, it is a pre-
19 judgment that you have to evaluate what kind
20 of information you need, which is relative to the
21 project you are studying, or the project you are
22 dealing with, and then beyond that identify your
23 information gaps, your really necessary information
24 gaps.

25 Q Now, just to take
26 your example, it is a very difficult thing to say
27 whether that study is important by itself, or may
28 be important, for example to Mr. Hayden, or Dr.
29 Finney in their assessment of whether the black
30 flies are important to aquatic species or for birds.

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1 You can't look at these things in isolation, is what
2 I am saying.

3 A No, you certainly can't
4 look at them in isolation and the individual specialists
5 have to identify the areas of concern within their
6 own discipline.

7 Q I don't necessarily
8 mean that either of you have to respond to that
9 particular example, because it just may not be
10 applicable, but all I am suggesting is that you
11 have to look at the spectrum of possible uses of a
12 black fly, for example, to assess an importance of
13 a study on it; and the same would be true of a
14 woodland caribou, whether you were trying to protect
15 it because it was an endangered species or an important
16 food source for people near Fort Simpson or Fort
17 Good Hope, or wherever, or in the case that Dr.
18 Whitney has raised of the bison herd near Fort
19 Providence, and perhaps Dr. Whitney can correct me
20 if I am mistaken, but that herd, as I understand, is
21 one of two pure wood bison herds on this continent,
22 the other one, I believe being in Elk Island Park,
23 and was set up in order to ensure the integrity of
24 that species. For that reason alone it may be important.

25 WITNESS WHITNEY: I would
26 agree. The only thing I would do is maybe add to that.
27 I don't know if that would really accomplish any-
28 thing.

29 Q That is one of the
30 reasons, though, why you want to pay attention to this

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1 population to make sure that your lateral will not in
2 some way adversely affect it?

3 A That is just one of
4 the reasons, yes.

5 WITNESS BOUCKHOUT: I may
6 say, though, Mr. Bayly, just to digress just for a
7 moment, in regard to the conversation we were having
8 about objectivity versus subjectivity just prior to
9 coffee break, Mr. Hayden has made me aware of another
10 report which is available which is entitled "Objective
11 and Subjective Judgments in Environmental Impact
12 Analysis" which may be of interest to the Inquiry.

13 Q Is that something that
14 you have in your possession that might be made
15 available as well?

16 A Yes, it is.

17 Q And I gather, Dr.
18 Whitney, while we are still on the subject of the
19 bison, one of the reasons that you would want
20 to co-operate with Dr. Calef's work on this herd is
21 to avoid duplicating work, to avoid additional
22 disturbance and this sort of thing that has been
23 referred to by Dr. Finney with regard to raptors?

24 WITNESS WHITNEY: I don't
25 think that the analogy is correct to make between
26 peregrine falcons and wood bison. That was not
27 our primary concern of protecting the animals. It
28 was certainly a concern, yes.

29 Q And would you agree
30 that one of the problems has been the one that you

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1 have identified, that there may be a lot of information
2 around that is difficult to get at, not necessarily
3 because it is a secret, but because there has been no
4 process as yet to collect it all together and index
5 it so that it is readily available?

6 A No, there are indices
7 that are, bibliographies of reports that we just
8 found out recently through interaction with people
9 in the Inquiry and we really haven't been able to
10 take advantage of that particular document at this
11 time and we certainly look forward to taking advantage
12 of it. Were you suggesting that perhaps that
13 was not enough and that you really thought that
14 more should be done?

15 Q I am suggesting that
16 in some ways we were seeing a process of the Inquiry
17 which is a catalyst, if you like, of getting people
18 from various areas in the same discipline together to
19 discuss what actually is known and what actually
20 has been done, perhaps for the first time in some
21 areas.

22 A Well, I think that
23 often times there are certain priorities on things
24 that are important and things that aren't important
25 and I have talked with various people about a specific
26 problem and they say, "Well, that is important", but
27 really a tremendous amount of territory that we have
28 to be responsible for, we have to set our priorities,
29 and so I think that one thing that the proposed
30 pipeline has done, is it has stimulated interest in

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1 some areas that before have not had a high priority,
2 but now they do have a high priority, and I would look
3 forward to very much in having workshops of some
4 type set up, in some efficient plan manner to tackle
5 some of these problems. I think that would be a
6 very profitable move.

7 Q All right. Now, if
8 we could go back just for a moment to the reindeer
9 herd and I am thinking not so much of its conflict
10 with -- or potential conflict with the Bluenose herd,
11 would you intend to study either this population
12 or to speak to the people who are managing it to
13 help you assess the possible effects of disturbance
14 from aircraft or construction or operations and
15 maintenance on the management of this herd?

16 A Absolutely. I think
17 that this is one thing that I am concerned about in
18 my order of priorities, in having to do an awful lot
19 in a very short time, I haven't made any formal
20 requests about this, but we have certainly discussed
21 it with Mr. Bouckhout, and we have discussed it with
22 other mammalogists from the Lombard North Group and
23 I think that we all agree that interactions should be
24 made with the reindeer herders, but we did not place
25 this as such a high priority because these animals
26 can be moved around, they can be herded. So they
27 could be herded away from construction or they
28 could be herded, put in different places as I under-
29 stand. Now, perhaps that is naive, but this is
30 what we had based our assessing as a low priority.

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1 A lower priority relatively.

2 Q And the fact that these
3 reindeer are in, what is known as a reindeer reserve
4 now, may at the moment define where they are herded,
5 that might be in conflict with facilities and you
6 would want to co-operate, I take it, if any realignment
7 of that reserve was necessary because of that conflict?

8 A I think certainly we would
9 want to co-operate. I don't know what more you
10 want than just saying that we would want to co-operate.

11 Q Well, this is getting
12 me into an area now of questioning that I went through
13 while you were here, I believe, with the Arctic Gas
14 panel, and that is on management of game, whether
15 it be, if you can call the reindeer a domestic animal
16 or whether it be a wild animal.

17 Now, realizing that game
18 management is not within the scope of the authority of
19 a pipeline company, nevertheless there appear to be
20 overlaps in studies and recommendations that have
21 come out from Arctic Gas and presumably will come
22 from the consultants to Foothills which will say,
23 if the game is managed in such and such a way or
24 if hunting is restricted during construction and
25 any number of ifs of that kind, we can predict that
26 the impacts will be acceptable from our point
27 of view. YOU would agree then, and I see you shaking
28 your head, in agreement -- Maybe I am wrong. Would
29 you agree that this is a likely result of some of
30 your work that you will see areas in which game

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1 management will have to fulfill certain roles?

2 A I would think that
3 many of us have been asking what is really being
4 accomplished by this Inquiry, and I think that that
5 would be one of the significant things that could
6 be accomplished by this Inquiry. I think it would
7 be a precedent and I would advise it.

8 Q Well, if we could just
9 turn to you, Mr. Bouckhout, one of the things that
10 was raised with Arctic Gas was the possibility of
11 its applicant, and I raise this with you from Foothills
12 point of view, having its consultants working, not only
13 on the impacts of the line itself, but on working on
14 recommendations that could be discussed with government
15 for the management of the game resources that may
16 be impacted, either by the construction of the facility
17 or by things which spin off from that or follow it.
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1 WITNESS BOUCKHOUT: Yes, well
2 what I personally have already done is make available
3 to various interested parties, including the Territorial
4 Fish & Wildlife Service, I believe it's called now,
5 our submission documents which indicates our plans
6 and intentions. I have also talked to personnel within
7 that Fish & Wildlife Service regarding certain aspects
8 of our project; in particular the need for a management
9 scheme, and I'm sure you're aware of what has been
10 done in Alaska relative to the Alyeska line, where they
11 have designated, I believe it's a 5-mile corridor in
12 which there's absolutely no hunting along the line, and
13 I have talked to management personnel about this very
14 issue, simply because I feel that it's not within our
15 realm of authority to be able to control hunting by
16 various people along the line, aside from people over
17 whom we have direct control. Obviously an issue like
18 this is very important, and it's relative to our pro-
19 ject since we will have many people involved in the
20 project, both directly as well as ancillary personnel
21 performing various tasks, and I think as you have
22 stated, the issue of game management is exceptionally
23 important and I think what the management people are
24 worried about is, what are they going to be left with
25 afterwards? What are they going to have to deal with,
26 and I think this is where we have full intentions of
27 co-operating to the nth degree to explain to them what
28 our intentions are, what our project entails, and
29 given our assessment of what we feel is going to be
30 left and certainly where we feel there might be some

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1 problem areas they should be prepared to cope with it
2 and we would certainly want to work in conjunction with
3 them in trying to develop a program which will be
4 adequate. As to what degree to which we can co-operate
5 in this area, we would really have to have discussions
6 regarding such undertakings.

7 Q So you would accept the
8 argument that your project may have effects that
9 really are the key to opening the door to certain areas
10 that so far have been closed to a large number of
11 people , and for this reason you want to discuss
12 with and perhaps assist government in formulating a
13 plan which will minimize these impacts which may not
14 result from you or your staff or your employees, but
15 may come after.

16 A Well, to adequately
17 answer that, I'd really need a further definition of
18 what you mean by "opening the door". If you mean actual
19 physical access, we will be providing another clearing
20 in the forest, so to speak, which will provide access
21 via snowmobile and so on. If you mean opening a door
22 by having additional personnel in a valley which weren't
23 there before, that's certainly true and we are concerned,
24 as biologists, about these various issues in regards
25 to what happens afterwards which we as an applicant
26 may not have direct control over but certainly have some
27 influence on, and we are definitely concerned about
28 these areas and certainly will co-operate with the
29 various agencies involved.

30 Q One of your other

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1 WITNESS BOUCKHOUT: Yes, well
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3 to various interested parties, including the Territorial
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23 important and I think what the management people are
24 worried about is, what are they going to be left with
25 afterwards? What are they going to have to deal with,
26 and I think this is where we have full intentions of
27 co-operating to the nth degree to explain to them what
28 our intentions are, what our project entails, and
29 given our assessment of what we feel is going to be
30 left and certainly where we feel there might be some

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1 for the procedures, for the timing, for all aspects
2 of the project and how decisions they make, might reflect
3 on the project generally, on the construction procedures
4 and so on. So what we're looking for ultimately, I
5 suppose, is the type of people we're never going to
6 find, but we have to get as close as possible to these
7 very well-rounded individuals who will be able to
8 perform their function adequately within their own
9 area.

10 Q And I gather that you
11 will also have to prepare a manual that not only
12 makes sense to a biologist and perhaps an engineer, but
13 also makes sense to the man on the bulldozer or the
14 wheel ditcher, one that he can comprehend in language
15 he can appreciate.

16 A Well, I think when I
17 refer to the preparation of a manual, the preparation
18 of a manual is really for the inspection staff and
19 for the supervisory staff to appreciate what the
20 restrictions and dos and don'ts are really going to
21 be within their own area. I don't anticipate that
22 this same manual would have to be read by the operation
23 staff, by the cat-skinners and so on. It's really an
24 impossibility, I think, to produce a manual which will
25 adequately perform both jobs. In other words, adequately
26 give the inspection staff and supervisory staff a
27 base to work from, and at the same time the same
28 manual being applicable to the other people on the
29 project. So really when I'm speaking of a manual I'm
30 speaking of something, a group of stipulations, a volume

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1 which will be used by the staff and then beyond that
2 the actual content of this type of manual would have
3 to be interpreted for the people who would be doing
4 the basic work on the project, for instance the cat-
5 skimmers, the welders and so on.

6 Q All right, and can I
7 safely leave questions with regard to their training
8 in Arctic and sub-Arctic techniques and problems to
9 the discussion that we will have with regard to the
10 Northern Training Program?

11 A Now, training of whom
12 are you speaking?

13 Q Training of the workers,
14 of the construction workers.

15 A I don't think so. I
16 don't really think that would be fair. Certainly I
17 would think the socio-economic panel would be talking
18 about training of the workers, but I would think
19 they'd be talking about this kind of training relative
20 to entrepreneurial activities relative to the possibility
21 of local people and other people for gaining employment
22 on the project.

23 Q So I should ask that
24 now of you.

25
26 A Yes, I think you should.

27 Q Can you tell me then,
28 you've said so far that the manual will be for the
29 inspectors, for staff. What sort of environmental train-
30 ing will you be giving to southerners and perhaps

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1 northerners who aren't used to being in the bush or
2 tundra areas in which you will be working, that will
3 equip them on the job to be able to identify at least
4 some of the problems, when the environmental inspector
5 is elsewhere on the spread? When will they know when
6 to lift the blade and stop?

7 A Development of such a
8 program is, you'll appreciate, a tremendously complex
9 task. I have at present a couple of fellows in
10 Foothills employ in Calgary working on this particular
11 issue. They have been working on it for some time. We
12 have some very preliminary thoughts, we've been kicking
13 around at bull sessions day by day, in fact these
14 two fellows have been talking to various other people
15 who will be contacting such organizations as those
16 involved in Adult Education, involved in Hunter Training
17 Programs, involved in all kinds of these endeavors,
18 and it's very, very difficult at this stage, in fact
19 it's impossible at this stage, really, to describe what
20 the ultimate information, education program will be.
21 It's going to have to be structured to the type of
22 people we're dealing with and obviously certain
23 people on the project will have a much greater opportu-
24 nity to do things which might detrimentally affect the
25 environment than others.

26 Q But some things have to
27 be appreciated, I suggest to you, by the -- by all the
28 construction workers. "Don't feed the bears, and
29 don't go out of camp for a walk when it's snowing and
30 blowing because you might freeze to death."

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1 A Oh yes, I agree.

2 Q And I suggest to you that
3 there are things that are more sophisticated than those
4 dos and don'ts that these people will have to know.

5 A I agree.

6 Q And if you take construc-
7 tion or labor in any project, this one included,
8 take this for an example, if you don't explain to a
9 man that he's likely to get an eye injury, he's
10 probably going to be reluctant to wear safety glasses.

11 A Well, I think a number
12 of those items you've just mentioned are really standard
13 practice with regard to any construction project. Of
14 course we're going to have professional people on the
15 project and various degrees of professional people and
16 certainly those types of issues aren't relevant to
17 my particular discipline.

18 Q I realize that. That was
19 just an example of the fact that a person has to know
20 why. If you don't tell a cat-skinner that he's got
21 to stay on the right-of-way because if he gets off it
22 he's going to disturb the active layer of the tundra
23 and leave tracks that may cause thermokarst, or whatever
24 you want to call it in language that he can understand,
25 he may go off and do it.

26 A Yes. Our own people
27 have already established that as a prerequisite to
28 the development of such a program, that you don't
29 tell a person, "Don't do it," but you in addition tell
30 him, "Don't do it because of this," and then try to

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1 show him an example of what might happen if he did
2 do something in other than an acceptable manner.

3 Q Because these people who
4 will be working, they aren't unintelligent, they just
5 may be ignorant of the environmental concerns that
6 you have expressed.

7 A Right.

8 Q And without an apprecia-
9 tion for what they are and the reasons why they
10 shouldn't be doing things, you may find that certain
11 things are uncontrollable unless you put an environmen-
12 tal inspector with each worker.

13 A I think that's carrying
14 it to the extreme.

15 Q That is the extreme,
16 obviously; but that is the problem, I suggest to you.
17 Unless a person knows why he should avoid something,
18 at least in simple terms, then he may go ahead and
19 do it because it's easier and he doesn't see the bad
20 results that may not occur till springtime.

21 A Well, I suggest to you,
22 Mr. Bayly, that I agree. Certainly it's necessary
23 that you make people aware of the possible repercussions
24 of their actions, not only the possible punitive
25 repercussions but as well the possible environmental
26 repercussions.

27 Q All right, and you 've
28 got to tell him or you've got to have Mr. Hayden
29 tell him that he'd better not go up to that spring
30 even though it's open in the winter and fish because

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1 it's an overwintering area and he may impair the
2 population of fish in that spring by doing so.

3 A Yes, agreed in general
4 terms.

5 Q Right. If he doesn't
6 know the reason why, though, it just may seem to be a
7 very inviting thing to do.

8 A Well, any law or regula-
9 tion established tends not to get, full co-operation is
10 not the word I'm looking for, but I'll use it in
11 any event, unless a person appreciates what the possible
12 repercussions are, and as I've already said, this is
13 a very necessary thing, that you not only have to
14 somehow, inform or instruct the people as to what
15 they have to do or what they can't do, but also give
16 them some sort of an indication as to what the possible
17 repercussions are. If you're able to do that, then
18 they tend to adhere to the various regulations and
19 guidelines much better.

20 Q And is this something
21 that you would anticipate would not be part of the
22 training program, but would be done on the job; or would
23 it be incorporated into the construction workers train-
24 ing program?

25 A I really couldn't tell
26 you at this stage, Mr. Bayly. As I say, I have people
27 working on this right now and they have asked me the
28 same questions, they have asked each other the same
29 questions for several weeks or months now and we really
30

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1
2 have it come to a final determination.

3 Q All right. Now, Mr.
4 Commissioner, I think this is a very important issue
5 and I would hope that just because the environmental
6 panel have not got to that stage yet, that we will
7 miss our opportunity. If something has been developed,
8 even in its initial stages by the time we get to
9 discussing Northern Training Programs or northern
10 training programs, I would hope that Foothills would
11 undertake to produce that at that time either through
12 the evidence of Mr. Bouckhout or somebody who is
13 appropriate.

14 Now, just a few specific
15 questions that arise out of the application. First
16 Mr. Hayden with regard to culverts. I'm referring to
17 the application, Part 5, Section D, "Environmental
18 Statement" at page 5.39. It's actually quite hard
19 to find because there are two areas of 5 point and
20 this one comes after 5.7, for some reason, but
21 before 6.0. I've often wondered, Mr. Commissioner,
22 who made up the numbering schemes for these applications.

23 WITNESS HAYDEN: I've found
24 it.

25 Q Now, at 5.7.3.9 under
26 "Interference with fish patterns"
27 there's a discussion of culverts and that all permanent
28 roads will have either culverts or bridges. You state
29 in that that wherever feasible they will have widths,
30 and I presume that's culverts, that will approximate

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1
2 the widths of the natural stream. Now at what season
3 does that refer to?

4 A I think what is inferred
5 here is they will be wide enough to accommodate maximum
6 flow and allow fish to move up during the period of
7 maximum flow, so you're really dealing in the spring.
8 I think probably on a braided stream, in the spring, is
9 going to be a very dispersed flow across there, and
10 if in fact there is a permanent road across that,
11 you/^{couldn't} really expect culverts to stretch for half
12 a mile across that. But the culverts would allow, the
13 idea is to allow upstream migration of fish.

14 Q Yes, you would agree
15 in that kind of stream that you might opt for the
16 bridge rather than the culvert in a braided stream.

17 A I would think so, yes.

18 Q On the next page of
19 this, you talk about having inverts placed at or below
20 the level of the stream bed, and I didn't know whether
21 an invert was a culvert or whether it was a portion of
22 the culvert, but I have not been able to identify it.

23 A Well, what I think an
24 invert is, is the entrance and the exit portion of
25 the culvert. The idea here being that it will
26 be put at or below the grade so that perhaps parent
27 materials can be in the culvert, thus decreasing the
28 mean velocity and better enabling fish to move upstream.

29 Q All right. Would you
30 anticipate having or have you studied culverts to

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1
2 decide whether you would want to put baffles in them
3 in addition to having the bottoms covered with natural
4 materials?

5 A Well, I haven't studied
6 them myself. The study I have done has been a review
7 of the literature and work done by Fisheries and Marine
8 Service. Presently I think they have an experiment
9 going on baffled culverts. It just seems to me it,
10 at sort of first reading, that you wouldn't want both
11 baffles and parent material because one would
12 negate the function of the other. Really they're both
13 directed toward the same sort of thing.

14 Q All right

15 A I can't say if I now
16 prefer baffled culverts to the parent material sort
17 of thing. I think that depends largely on the outcome
18 of the experiments that are being done by Federal
19 Fisheries.

20 Q Would you anticipate
21 using fish culverts as well as culverts to take
22 the mean stream flow, such as the crossing of the
23 Ringling River by the Dempster Highway has employed?

24 A Well, I think probably
25 in situations where they would be applicable, a fish
26 culvert or one placed differently so as to allow
27 better movement of fish would be a good idea, if
28 that's what you mean.

29 Q Yes, the fish culvert
30 in this case was one that was set at a higher elevation

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1 mainly in the mound of the roadway.

2 A It depends largely on
3 engineering aspects, whether that would, you know,
4 stay in more or less, this sort of thing that I would
5 be in favor of that, sir.

6 Q Now with regard to you,
7 Dr. Finney, could you refer to the same volume at
8 5-D, 5.43, just a few pages on?

9 WITNESS FINNEY: 5.43?

10 Q Five D - 5.43, yes.

11 A All right, I've got it.

12 Q O.K. Now, I understand
13 that on Richards Island there are also spring areas
14 where birds gather in springtime which may be important
15 to them that don't appear to be referred to in your
16 paragraph on spring migration. Are you aware of those
17 and would they be added later on?

18 A Yes.

19 Q And you are aware that
20 it has been the custom to hunt birds in the spring
21 in these -- in that particular area.

22 A Spring hunt on the delta
23 in general, I have no doubt takes place, and on back
24 up the Mackenzie. It tends to be of low volume, however.

25 Q Yes, but it may be of
26 importance as a food source to people who do engage
27 in that.

28 A Yes, it may.

29 Q Now, you also refer on
30 the next page to aircraft and birds, and one of the

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1
2 protection measures at page 5-D-5.44(a), the second
3 sentence:

4 "Overflights of aircraft, especially large
5 helicopters at less than 2,000 feet altitude
6 will not be permitted in critical migration
7 areas during the seasonal time frame."

8 Do you have recommendations for other periods of time,
9 for other altitudes of flight?

10 A Is this with respect
11 to spring migration or in general?

12 Q Well, you have here only
13 outlined May 1st to June 15th in this paragraph and
14 I'm wondering if you have made recommendations that
15 at other times of the year the helicopters could fly
16 at different flight levels and not have an adverse
17 impact, in your view.
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1 A My general recommendation
2 is that flights, wherever possible should be kept at
3 2,000 feet. I don't think it is generally necessary
4 for . company aircraft to come below that level very
5 often during the summer. Again, we are saved somewhat
6 by winter construction when most of the helicopter
7 activity will be going, but certainly over breeding
8 areas, fall migration areas, the same criterion would
9 apply.

10 Q I gather that you would
11 recommend that this would be all flights since
12 birds are probably not able to tell whether it is a
13 Foothills helicopter or a government helicopter or
14 a private charter.

15 A I haven't run that
16 particular experiment, so I can only give you my
17 subjective opinion, but I feel they probably couldn't.

18 Q They probably couldn't
19 tell, no.

20 A They probably couldn't
21 tell, and certainly --

22 THE COMMISSIONER: I don't
23 think we have to do any experiments on that, do we?

24 MR. BAYLY: I don't think
25 so, sir, no, but this is a problem.

26 A That would be our
27 recommendation, certainly.

28 Q Now, Mr. Bouckhout, have
29 you or will you be having discussions with the Ministry
30 of Transport to see whether it is feasible to turn

1 this recommendation into something more concrete that
2 might apply to all aircraft flying in the area
3 of the pipeline at the time of construction and
4 operation and maintenance?

5 WITNESS BOUCKHOUT: I have
6 not had such discussions to date. I don't believe
7 that the establishment of minimum in flight altitudes
8 for other than company aircraft is a matter of
9 authority to us. We might make the recommendation
10 or we might have discussions with other people,
11 for instance, various government agencies, regarding
12 what we feel are of concern, and they can react to
13 that via discussions with the appropriate agency
14 being probably M.O.T. as to what they might want
15 to establish.

16 Q I gather that Dr. Gunn
17 had suggested already to the authorities that perhaps
18 certain flight paths could be designated, rather than
19 altitudes in some areas to avoid disturbance of
20 known critical or sensitive, I think he prefers the
21 term sensitive areas, for various birds?

22 A Yes, in respect to this
23 I think that we are talking about either minimum
24 in flight altitudes or flight corridors or both.

25 Q All right, and you would
26 be having these kinds of discussions then, I would
27 anticipate, to see whether this was something that
28 could be worked out?

29 A Yes, I would think we
30 would particularly have these discussions with the

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1 appropriate government and environmental agencies
2 who would then go beyond that to have -the appropriate
3 discussions with the regulatory agencies.

4 Q Yes, did you want to
5 say something more on this, Dr. Finney?

6 WITNESS FINNEY: The only
7 thing that I would like to add is that flight
8 corridors would be preferable to altitudes, if they
9 could be arranged.

10 Q Now, with regard again
11 to disturbance by aircraft, if we can move to
12 Dr. Whitney, there appears in 5-D-5.53 a summary
13 of --

14 WITNESS HAYDEN: If I might
15 just interrupt. Mr. Finney is not feeling
16 well and he has left the room. He will return and
17 I don't want to interrupt Mr. Bayly's cross-examination.
18 If he can continue without him that is fine.

19 MR. BAYLY: Yes, my questions
20 now are finished. I have finished questioning Dr.
21 Finney.

22 THE COMMISSIONER: I am sorry,
23 who is not feeling well?

24 WITNESS HAYDEN: Dr. Finney.

25 THE COMMISSIONER: Oh.

26 WITNESS WHITNEY: He will
27 be right back.

28 THE COMMISSIONER: Well, how
29 are you getting on, Mr. Bayly?

30 MR. BAYLY: I am almost

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1 finsihed, sir.

2 THE COMMISSIONER: Good.

3 MR. BAYLY: On that page,
4 Dr. Whitney, you refer to possible effects of
5 disturbance by aircraft and perhaps I can just
6 read these into the record and you can tell me whether
7 the status of your opinion on these has changed since
8 the writing of this impact statement. It says:

9 "Direct effects of aircraft disturbance
10 or harassment of mammals may cause A)
11 excessive energy expenditure; B) outright
12 injury or mortality; C) edema and possible
13 later death; D) abortion; E) fragmentation
14 of social groups; F) withdrawal from critical
15 habitat; and G) poor reproductive performance."

16 And I gather that that is a general statement about
17 aircraft disturbance that is potential to all mammals,
18 or would you agree?

19 A I would stress the
20 potenial and I would agree. I would also say
21 that many of these phenomena are very normal
22 phenomena without harassment.

23 Q Yes, and would you add
24 any to these since the writing of this statement
25 with regard either to mammals in general or any
26 particular mammal?

27 A It is not there. I
28 certainly can see that there might be others that I
29 have thought of that are not coming to mind now that
30 may be included.

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1 Q Perhaps you could con-
2 sider that over lunch and if there are any that
3 you could think of that you would want to add to the
4 list you could do it at that time.

5 A Okay.

6 Q And you have said as
7 well in your protective measures at the bottom
8 of the page:

9 "Harassment of mammals by aircraft will be
10 prohibited at all times."

11 And I gather what you mean by harassment is deliberate
12 either chasing them or trying to get close enough
13 to get a good picture or whatever, as opposed to
14 flying over them which may have a disturbing effect.

15 A I think that we are
16 involved in qualifiers here and to me the intent of
17 the statement would be -- I see the intent of the
18 statement as being one of concern and if we could
19 go into deliberation of exactly what does harassment
20 mean and what does prohibition mean I don't know what
21 we would accomplish, but perhaps you could elucidate
22 that.

23 Q My concern, Dr. Whitney
24 is this, that no matter what happens with this
25 project, there will be aircraft flying over some
26 mammals. Will you accept that as something that
27 you feel is going to happen?

28 A Well, I think that it
29 has happened and it will continue to happen.

30 Q Now, I gather that is

1 not what you mean by prohibiting harassment, because
2 by doing that you would effectively preclude air-
3 craft from flying over mammals.

4 A I just don't know
5 where this is taking us. I think that harassment has
6 something to do with malintent or maybe ignorance
7 as well, but hopefully that won't be a problem after
8 these environmental manuals come out.

9 Q Well, good guys can
10 harass too, I suggest to you, because even a
11 person who is studying mammals because he wants to
12 get a better look and he says it is for the mammal's
13 own good in the general scheme theme of population
14 dynamics or whatever, for him to get a better look,
15 he may harass them. The animals may not understand.

16 A I think what we are
17 talking about is the Heisenberg uncertainty principle
18 and if you would like to talk about it over at lunch
19 I would be very interested in it, but I think it is
20 very appropriate to science, but I don't know what
21 appropriateness it is to this Inquiry.

22 Q Well, here is my con-
23 cern. We may be dealing with the possibility that
24 people disturb to the point of harassment, populations
25 of mammals without any malintent. They want to get
26 a better look, or they are interested, or the
27 ceiling is so low to be safe that they have to
28 fly below prescribed levels. Now, you can probably
29 prevent the first two by instructing people who may
30 be ignorant of it, that you can harass animals without
meaning to, do you agree with that?

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1 A Yes.

2 Q The third one may be very
3 difficult, because where the safety of human beings,
4 and aircraft is concerned, generally the feeling seems
5 to be that you've got to save the people.

WITNESS BOUCKHOUT:

6 A The third one may very
7 well be impossible.

8 Q Exactly. The people are
9 in the air and a fog comes in and they have to get
10 underneath it, ~~and~~ they will go underneath it. But in
11 general what you're saying by this, I gather, is that
12 you don't want people deliberately bothering mammals
13 because of the problems you've outlined, and you'd
14 like to see the same sort of thing that Dr. Finney
15 has suggested in flight level guidelines and perhaps
16 flight corridor guidelines to avoid this kind of
17 conflict.

18 WITNESS WHITNEY: Absolutely.

19 Q What would these flight levels
20 be or
21 /have you determined whether they are the same as
22 Dr. Finney's, or whether they'd be different?

22 A I would think that they
23 would be very similar. My ideas would be very similar
24 to Dr. Finney's. However, there are some animals such
25 as wood bison that we don't know what the problems
26 of harassment are there, but there are already rules
27 in the Mackenzie Bison Sanctuary, I think it's 2,000
28 feet or it might be 1,600 feet, I'm not too sure
29 which, and so we would certainly try to adhere to those
30 rules.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Bayly

Q All right, so --

A I'm not sure if --

Q All right, you would

then be a person that might be able to assist in
preparing Foothills presentation to whoever the
relevant government people were, to say, "Look, if we
use those flight corridors and these flight levels
we can probably avoid the problems I'm concerned with.

A Oh, absolutely.

Q I just want to make sure
you're included in that discussion as well as Dr.
Finney because there are perhaps different flight
levels, different corridors, that may be applicable
to the different animals and birds.

A Yes.

MR. BAYLY: Those are all
the questions I have, sir.

THE COMMISSIONER: Thank you,
Mr. Bayly. Well, we would be moving on then to Mr.
Marshall but it's almost 12:30. Suppose we adjourn now
until two.

MR. MARSHALL: Whatever you
like, sir.

(PROCEEDINGS ADJOURNED TO 2 P.M.)

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Well,

let's come to order, ladies and gentlemen, and Mr. Marshall can continue with cross-examination of the panel.

CROSS-EXAMINATION BY MR. MARSHALL:

Q Thank you, sir. Mr. Bouckhout, you're the manager of environmental affairs for Foothills, is that correct?

A That is correct.

Q Do I understand correctly, sir, that your responsibility would be to do the following things: study and analyse the living environment along the proposed pipeline right-of-way, that is, gather base line data?

A That is the responsibility of the consultants and they report to me.

Q Yes, and once you know the base line you consider the impact of the construction and operations and maintenance activities that are proposed?

A Yes, actually, that is right.

Q And then you would recommend and assess the effectiveness of various mitigative measures?

A We would react to our assessment of the potential interaction of the project with the environment by designating mitigative measures.

Q And you would attempt

1 to assess how effective those mitigative measures
2 would be in, indeed, mitigating environmental impacts?
3

4 A Certainly.

5 Q Right, and once you
6 have done that, I take it, you have got your base line,
7 you have looked at what the applicant intends to do and
8 you have considered it and made recommendations with
9 respect to mitigative measures, you arrive at an
10 overall comprehensive environmental impact assessment,
11 is that fair to say?

12 A I would think you would,
13 yes, you would arrive at an environmental assessment.

14 Q And that description I
15 have just given, would, I suppose, suffice as a short
16 description of the environmental impact assessment
17 process, if you like, that is underway by Foothills by
18 doing those various things?

19 A I think so. There might
20 be some others I want to add, but that is a fairly
21 concise description.

22 Q Now, you have mentioned
23 that in order to do this, Foothills has retained the
24 services of Lombard North and they have handled all
25 of the aspects of environmental assessment except
26 for the archaeological aspect which Dr. Reeves looked
27 after?

28 A No, they've handled
29 all of the biological aspects. We have, of course,
30 geotechnical people working for us as consultants
who handle the assessment of terrain and so on,

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 hydrological --

2 Q But dealing with the
3 living environment --

4 A Dealing with the bio-
5 logical environments --

6 Q Right, and excluding
7 the archaeological, Lombard North have undertaken
8 this process for Foothills

9 A I don't know why you
10 exclude archaeology since it is really not what I
11 consider part of the biological or living environment.

12 Q It is not what you
13 consider --

14 A I don't consider archa-
15 eological resources as part of the living environment.

16 Q That is fine. I have
17 got no argument with you .

18 Now, Mr. Bouckhout, you will
19 agree with me, will you, that the Foothills project
20 main line in the Northwest Territories is about
21 800 miles long?

22 A Yes.

23 Q We have been told by
24 previous panels that the most northerly 200 miles of
25 that line differs from the Arctic Gas line.

26 A Yes, I believe that is
27 approximately right.

28 Q And approximately the
29 bottom 200 miles of the line differs from the
30 Arctic Gas line as well?

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 A Yes, to some extent.

2 Q So insofar as the
3 mainline from Richard's Island to the 60th parallel
4 is concerned, we are talking about differences in the
5 right-of-way over an extent of about 400 miles
6 between the two projects?

7 A Yes, I think that we
8 are talking about that. We are talking about
9 differences which, you know, may be differences of
10 a quarter of a mile, up to several miles, in lateral
11 extent.

12 Q Now, as an integral
13 part of the Foothills' system it is proposed that there
14 be gas supply laterals, gas delivery laterals to
15 the communities and I understand that those are
16 about another 400 miles in length?

17 A I believe that that
18 is approximately correct.

19 Q So that over perhaps
20 800 miles of right-of-way in the Northwest Territories
21 there would be differences between Foothills' right-
22 of-way and Arctic Gas's right-of-way.

23 A In exact location, that
24 is right.

25 Q Now, sir, you and your
26 panel have indicated that among other things you
27 had available to you all of the environmental work
28 that was done by the Arctic Gas consultants when
29 Alberta Gas Trunklines was a sponsor of the
30 Arctic Gas Project.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 A Yes, that was available.

2 Q And further, you have
3 had available, among other things, environmental
4 work that is found in Biological Report Series
5 that have been published since Trunklines ceased to
6 participate in the consortium?

7 A That is right. We have
8 acquired those volumes.

9 Q NOW, is it fair to
10 say, Mr. Bouckhout, that in areas where the Arctic
11 Gas and Foothills lines in the Mackenzie Valley
12 are more or less common, I take it that would be
13 about roughly the middle 400 miles or so, Foothills
14 is generally in agreement with the impact assessment
15 of the Arctic Gas consultants on the impact on
16 the biological environment?

17 A I would really
18 want to turn that question to the individual
19 disciplinary professionals here, that would probably
20 be the best way of approaching that particular
21 topic.

22 Q Well, I am interested in
23 it really from a general point of view. We could
24 spend a great deal of time, I suppose on specifics,
25 but I wonder if, in general terms, Foothills finds itself
26 in overall agreement with the impact assessment that
27 had been given by the Arctic Gas consultants for that
28 approximate 400 mile section of line?

29 A Well, I am not sure if
30 that is entirely correct. I have read a number of

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 places where terminology has been used such as there
2 will be no problem essentially, I am paraphrasing,
3 of course, you know, that we don't anticipate any
4 problems with this aspect or that aspect, and I am
5 not in total agreement with that. I would say that
6 from a personal point of view, I do anticipate some
7 problems, irregardless of having designated protection
8 measures, etc., that is, as I have said in my own
9 direct testimony, that I anticipate problems and I
10 anticipate some potentially serious problems.

11 Q Would it be fair to
12 say that the comments that you have just made are
13 based on your interpretation of work that consultants
14 to Arctic Gas did, in other words, you are using that
15 data base and you interpret it slightly differently,
16 or perhaps even quite a bit differently than the
17 Arctic Gas Consultants did?

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Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 A In arriving at my
2 conclusion if I anticipate problems?

3 Q Yes.

4 A I arrive at that conclus-
5 ion simply on the basis of what's gone before. I don't
6 think any rational practical person can really look at
7 a problem of this magnitude in this type of an area
8 and say, you know, we don't anticipate there is going
9 to be any problems. I think that's impossible.

10 Q Do I understand correctly,
11 Mr. Bouckhout, that the environmental studies undertaken
12 on behalf of Foothills haven't really concentrated on
13 that 400 mile area that's more or less common to the
14 two projects, and instead^{have} dealt with those areas
15 where there are differences in the right-of-way align-
16 ment? Specifically the upper 200 miles or northern
17 200 miles -- just let me finish, if I could -- the
18 bottom 200 miles and the 400 or so miles of laterals.

19 A We certainly placed some
20 emphasis on baseline type information gathering on the
21 lateral system, and particularly, as you note, the
22 Yellowknife-Pine Point lateral and so on. With regards
23 to the mainline, one of our major pushes has been to
24 assess facilities locations along the mainline, along
25 the entire 800 miles of mainline which in many respects
26 are quite different from the actual location of facili-
27 ties for Arctic Gas.

28 Q That's ^{the} site-specific
29 assessment of such locations as wharves, compressor
30 stations and that sort of thing.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 A Yes, that's right.

2 Q I see. Dr. Whitney,
3 you're the project manager for Lombard North on Foot-
4 hills' project, is that correct?

5 WITNESS WHITNEY: That's
6 correct.

7 Q And you've been following
8 my discussion with Mr. Bouckhout. Do you have any
9 reservations about what he's been telling me? Do you
10 generally agree with that summary of what's been under-
11 taken?

12 A I would say that we haven't
13 -- that our assessment of the line, of the mainline in
14 the areas where there are slight differences, in the
15 majority of the cases, I understand now, between all
16 the line changes near Fort Simpson and near Travallant
17 Lake, that we're really pretty close in there and
18 I don't think that we have really necessarily concen-
19 trated on those areas the way that we've concentrated
20 and plan to concentrate on the Yellowknife lateral.

21 Q I see. Now, Dr. Whitney,
22 I understand from the evidence that Lombard North began
23 its work for Foothills late in 1974.

24 A That sounds right.

25 Q Is it fair to say, that's
26 in the direct evidence, I take it that's the correct
27 date, is it, Mr. Bouckhout?

28 WITNESS BOUCKHOUT: Yes, it is.
29 The actual contract arrangements, I believe, were made
30 in late '74.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 Q Now, Dr. Whitney, would
2 it be fair to say that Lombard North has not yet
3 completed the analysis of its studies that were
4 carried out this past season? I think you indicated
5 that the reports still haven't been prepared and I
6 gather you're still analyzing the data that you
7 obtained in the field.

8 WITNESS WHITNEY: Yes, we
9 submitted, yes, that's right.

10 Q Now, you've indicated
11 further in your evidence, and I'm particularly referring
12 you to the cross-examination that my learned friend
13 Mr. Bayly, conducted this morning. You indicated that
14 there were a number of -- you had detailed a number
15 of environmental concerns that you and the team
16 working at Lombard had identified or suspected,
17 particularly along the laterals. Your evidence lists
18 a number of concerns that you have related to the
19 environmental impact that those laterals may have.
20 Is that fair to say?

21 A I know I list those in
22 my direct, and I referred to some of those. I can't
23 remember the specific ones, you'll have to maybe
24 review those for me.

25 Q Well, for example, concerns
26 with bison and with woodland caribou.

27 A Yes, I am concerned about
28 it.

29 Q I think all the members
30 of the panel have indicated areas along the laterals

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 that are within the scope of their discipline, they've
2 recognized as concerns and which they intend to study.

3 A Yes.

4 Q That's a fair summation?

5 Would it be fair to say, Dr. Whitney, that these various
6 concerns that were spoken to by the members of the
7 panel this morning in many cases have to be identified
8 more precisely, and then assessed by Lombard in future
9 programs that to this point haven't been undertaken.

10 A No, I don't think I would
11 agree with that. If you think that -- no, I don't
12 agree with it.

13 Q Well, sir, I understood
14 your evidence, in your direct evidence and in your
15 cross-examination this morning, to indicate that there
16 were a number of concerns that had been identified
17 and you wished to conduct studies of these concerns
18 to identify the extent of possible interactions between
19 the pipeline and various aspects of the living
20 environment.

21 A Yes, we have identified
22 some of the studies we've started, some of the studies
23 we haven't started.

24 Q But at this point in
25 time all of the studies have not been completed. Some
26 are started, some have not yet been started.

27 A That's correct.

28 Q Well then, Dr. Whitney,
29 would you agree with me that because you have not yet
30 done work in all of these areas where you have identified

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 concerns, that Lombard North has not yet been able
2 to do an overall comprehensive environmental impact
3 assessment of the Foothills project?

4 A That's correct.

5 Q What we have then in
6 your evidence to this point is essentially a progress
7 report, as to where you stand now and an indication
8 of the studies you intend to carry out in the future.

9 A That's correct.

10 Q Can you tell me, Dr.
11 Whitney, when you as the project manager on this
12 project for Lombard North, anticipate that your firm
13 will have undertaken sufficient studies and have had
14 sufficient time to analyze those studies, to be in a
15 position to make an overall comprehensive environmental
16 impact assessment of the Foothills project, including
17 the delivery laterals?

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Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall

1 A Well, I think that if
2 I could give you that answer now, there wouldn't be
3 any reason for doing the studies.

4 Q Well, I've put it to you
5 that way because I understood from Mr. Kondla's
6 evidence, for example, that he feels that the vegetation
7 work done this past season of itself won't be sufficient
8 to bring the level of detailed knowledge up to that
9 which he has for the mainline, and he would like to
10 have another season's work. I take it that would
11 mean, then, that you've got another year's study in
12 the vegetation area before he's got the information
13 he feels he requires in order to get up to the same
14 level of detail he's got for the mainline.

15 WITNESS BOUCKHOUT:

16 A Mr. Marshall, in regards
17 to this question there are a number of variables that
18 have to be taken into account, of course, and this
19 includes such variables as the total manpower put
20 onto the project, the amount of information which may
21 surface over the forthcoming years which has not
22 surfaced to date and so on. So these variables have
23 to be taken into account when you try and put a
24 time frame on anything like this.

25 Q Well, I wonder if Dr.
26 Whitney could carry this a little bit further, sir,
27 on the basis of the programs that are now under way or
28 that are planned to be undertaken, can you give me any
29 sort of general indication, in terms of years, say, as
30 to when you expect that Lombard North will be in a
position to make an overall comprehensive environmental

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Marshall
Cross-Exam by Scott

1
2 impact assessment of the Foothills project?

3 WITNESS WHITNEY: Well, I'll
4 just qualify that a bit and --

5 Q If you can't answer,
6 sir, that's fine.

7 A I firmly believe that an
8 environmental impact statement is an ongoing thing
9 and I firmly believe that if we identify some things
10 after our reconnaissance studies that are very, very
11 important to the impact of the proposed line, it could
12 very well delay the study, or I would recommend that
13 the study -- that the construction say might be delayed
14 until we could convince ourselves that proper mitigative
15 measures could be designed.

16 Q And that's as far as you
17 want to go on this point?

18 A Oh, I think so. Do you
19 understand my point? I really don't feel that we can
20 predict these things, ^{and it is} /this type of thing, and that's
21 one reason we're doing the environmental impact study
22 is to determine such things.

23 MR. MARSHALL:
24 Thank you, gentlemen. I
25 have no further questions.

26 CROSS-EXAMINATION BY MR. SCOTT:

27 Q Gentlemen, I take it
28 that whatever stage you may be at in your long-term
29 goals, each of you has had an opportunity to read the
30 literature and to read and analyze from the point of

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1
2 view of your own discipline the relevant portions of
3 the Arctic Gas application and studies. Is that correct?
4 Anybody say "no" to that? I'll take it that the
5 answer is "no", or that everybody has done that.

6 Has everybody on the panel or
7 was everybody on the panel present when the equivalent
8 Arctic Gas expert in their discipline gave evidence
9 at this Inquiry?

10 WITNESS HAYDEN: Yes, I think
11 we were all -- I might qualify that to say that I
12 wasn't present for all of Dr McCart's evidence.

13 Q Well, did you hear his
14 evidence on the last panel?

15 A Yes, but not all of
16 that, when he continued the following week I wasn't
17 here to hear that, although I have seen it in the
18 transcript.

19 Q You have seen it in the
20 transcript, have you?

21 A Yes.

22 Q Well, let me tell you
23 then in the case of each of you, the last question I
24 propose to ask in this examination will be, what do
25 each of you within the area of your own disciplines
26 regard as the gaps or deficiencies or short-falls
27 in the Arctic Gas study and approach, if any?
28 I've given that to you now so you can begin to, if
29 you have a moment, to think about it and we'll come
30 to that at the end. I'd like to begin with the

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1
2 question of the fishes, and I would like to see if I
3 understand in a general way the process that is before
4 you as you move toward the culmination of your work,
5 and perhaps I could begin by asking you, Mr. Hayden,
6 to take in your mind a river that would be generally
7 regarded as an important fish river, like the Willowlake
8 River or the Great Bear, or the Donnelly, a river of
9 about that size and dimension and importance. Now do
10 you have that kind of thing in your mind?

11 A Yes.

12 Q Well now, I take it that
13 your obligation to your client is to make recommenda-
14 tions or to react to the client's proposals as to how
15 the river we're discussing shall be crossed, that is
16 where it shall be crossed, when, that is in what
17 part of the construction season, if there is a preference
18 it should be crossed, and how, that is the appropriate
19 design techniques insofar as you're concerned with
20 them, / ^{should} be utilized in effecting a crossing. Now is
21 that your function?

22 A I think that's certainly
23 part of it. The latter facet of that I may find
24 difficult to respond to, since I don't really have a
25 strong engineering background, or an engineering
26 background at all. But I can say in a general sense
27 that whatever technique they use to cross, you know,
28 I would be looking at the possible detrimental effects
29 of that particular type of crossing compared to another
30 technique.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1
2 Q So you expect to either
3 react to their proposed modes of crossing, or alterna-
4 tively, to make specific recommendations in an
5 appropriate case.

6 A I think that's true.
7 It isn't entirely a reaction, you know, a reaction
8 situation.

9 Q No. Well now, bearing
10 in mind that is your general function with respect to
11 the typical important river we're taking in our mind,
12 and bearing in mind that a river like Willowlake or
13 Great Bear or the Donnelly will have a number of
14 fish potentialities, such as spawning grounds, commer-
15 cially important fish, or the possibility of their
16 existence, fish migrations, fish overwintering areas
17 and so on, what do you want to know about the river,
18 the fishes, and the other aquatic biology before you
19 begin to make recommendations or react to proposals?
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Bouckhout, Hayden, Finney,
Whitney, Kondla
Cross-Exam by Scott

1 Just a checklist, if
2 such a thing is possible.

3 A Well, certainly it is
4 also important here that I know from Foothills
5 what time of year, whether it is really a summer or a
6 winter crossing that is intended for that thing
7 because I would emphasize different things at different
8 times of the year, but I would want to know what
9 fish are in the river and I would want to know as
10 much as I could about the fish use of the river,
11 whether it is a spawning area or an overwintering
12 area or a migration path, a nursery area, that sort
13 of thing.

14 Q And with respect to
15 that, I take it, you want that information with some
16 particularity as to site, because it may tell you
17 whether you want to cross higher up or lower down.

18 A That is true although it
19 is often very difficult to get site specific, say,
20 spawning information on some fish.

21 Q Yes.

22 A The spawning grounds
23 of Arctic char are probably easier to identify than
24 for most fish species, but it is probably a situation,
25 Mr. Scott, that I would never be entirely satisfied
26 that I knew everything that I should about a
27 stream, but then I don't know any stream that anybody
28 is in that situation on.

29 Q Well, what else would
30 you want to know before you made recommendations, or is

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 that it? A river of this type.

2 A Something, for instance,
3 the Great Bear River, I would be of course interested
4 in the method that they were planning to cross it
5 and how long the crossing would take, how long they
6 would anticipate that to take, how much disturbance
7 of the bank and of the stream and the
8 river bottom itself, that sort of thing, and as well
9 I would like to know fish harvest information on
10 the river so that I could make recommendations
11 relative to an appropriate timing of the construction,
12 these sorts of things.

13 Q Would you like to know
14 something and perhaps you have covered this, about
15 numbers? About the extent to which the river
16 is heavily populated?

17 A Well, I would very
18 much like to know numbers. I think it becomes a
19 very difficult thing to make population estimates on
20 a river the size of the Great Bear River. I think
21 you have to be, well, certainly subjective in deciding,
22 putting a relative importance or level of degree of
23 importance of a particular river of that size.

24 Q Do you want to know
25 anything about the river volumes or velocities at
26 various times of the year?

27 A Well, I certainly would
28 want to know what effect construction would have on
29 those velocities at various times of the year.

30 Q Well, does that mean

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 knowing something about the velocities and the
2 volumes?

3 A Well, it would.

4 Q Yes. Do you want
5 to know anything about the tolerance levels of fish
6 with respect to various kinds of disturbance, such
7 as siltation and so on?

8 A Again, that would be
9 very good to know, to know exactly what limits
10 could be set, but I think that it is a very, very
11 difficult thing to find out. We know something
12 about the tolerance limits relative to, say, oxygen
13 supply in the water. As far as saying exactly how
14 much silt that adult fish perhaps can stand, I
15 anticipate that you would probably have adverse
16 effects expressed on things other than on fish
17 before they damage fish directly, sort of thing.
18 I more or less am saying that I would like to know
19 that. Some of those things are so difficult to
20 get that I am not too sure that we will ever be at
21 that particular state.

22 Q Well, I take it what
23 you are telling me is the list of things you would
24 like to have, adding the rider that you are skeptical
25 about possessing some or all of them in maximum
26 measure?

27 A Well, I am skeptical
28 or realistic, I don't know which term you would want
29 to use, but --

30 Q Well, I use them

1 interchangeably, Mr. Marshall doesn't, but --

2 A I think some particular
3 things, it becomes a matter of, I guess, priorities,
4 the most serious things that you want to know the
5 most about first and so it would be more important that
6 you knew exactly the information on that.

7 Q All right. Well, are
8 there any other substantial pieces of information
9 that you would like to have before you are called
10 on to make your final recommendations with respect
11 to a river of importance?

12 A Well, if you mean the
13 river of importance to be one such as the Great
14 Bear River, I alluded to that in my direct evidence
15 that I would like to know more about the winter
16 ecology of fish. Now, I think it is a general
17 understanding that the Great Bear River is in fact
18 an overwintering area for a good number of fish.
19 To the best of my knowledge very little domestic
20 fishing is done there, so we don't have information
21 from that source in the winter. Domestic fishing
22 in the winter not being done there. I would say that
23 the main deficiency that I have on a river, that
24 particular river, is what is there in the winter and
25 what is ^{occurring} in the winter.

26
27 Q Well, now I take it
28 that the kind of information to which you referred is,
29 in a sense baseline information that you want to have
30 at hand before you begin to measure impacts or make

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

recommendations about engineering proposals?

A I think it could probably be described as baseline information and my assessment would be much better, I believe if I had that information at hand.

Q And I take it that what you do to collect that, and let's be practical, is that you go first to Arctic Gas's material and their studies because they have collected a good deal, and then you go to the Fisheries Service material where it is available, is that correct?

A I have already done that, yes.

Q All right, and then you are able to gauge the information shortfall, as far as you are concerned, and go out and attempt to find the balance of the information yourself?

A That is true.

Q All right. Now, that is the process as I understand it, and correct me if I am wrong, that you would follow in dealing with, let us say, the Great Bear River.

A That is right.

Q Yes. Now, what I want to know is on how many rivers may we expect that you would want this kind of information, on what proportion of the rivers that will be crossed do you anticipate that this kind of information is required?

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 River or lakes in the event that any are crossed.

2 A Well, it would be rivers
3 and possibly one lake. Two obvious ones come to me
4 now, and that is the Great Bear River itself, and
5 the second being the Hare Indian River. Rivers such
6 as the Willowlake River, well, and I should add the
7 Mackenzie itself, although quite a bit of sampling
8 has been done there already in winter.

9 Q Well, leaving aside the
10 Mackenzie, because it's with you all the way along the
11 route, and thinking of the other rivers, what is the
12 proportion of the task that is before you? That is
13 on how many river do you anticipate that this informa-
14 tion will have to be collected either from existing
15 sources or by your own field work?

16 A Well, I think from
17 one river to another there is a different degree of
18 deficiency, and on rivers/such as the Great Bear River,
19 and as I said before the Hare Indian River, those
20 are two rivers that I think we probably have the most
21 to learn about right now. Some other rivers or
22 creeks, such as Hodgson Creek, has been studied and
23 I think we'll want to look at those situations again
24 but perhaps it will not be necessary to look in the
25 detail that we're looking at the larger rivers.

26 I think one of my major
27 concerns is with fall spawning fish here, and
28 relative to the winter studies and in our field program
29 this last year during the fall when we came up the
30 Mackenzie Valley sampling crossing sites, we found no

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1
2 evidence really of the fall spawning fish in the
3 crossing sites. It could very well be that many of
4 the small rivers or streams, creeks, these sort of
5 water bodies, are not used by fall spawning fish
6 because they may in effect freeze to the bottom in
7 winter.

8 Q Well --

9 A In the larger ones the
10 possibility is more likely.

11 Q -- maybe you and I are
12 slipping away from each other for a minute now. Let's
13 see if I can state again what I was anxious to know
14 by this example. Presumably you could say to me,
15 "Look, before I make realistic recommendations, I want
16 to have that information on every river we cross, all
17 500 of them," or you can say, "Well, I only need it on
18 two."

19 Now what I'm trying to get
20 at is where do you fall between those two alternatives?

21 A You're talking about
22 information relative to winter fish ecology?

23 Q No, I'm talking about
24 -- you've described for me the base data that is required
25 with respect to one river that we were talking about,
26 the Great Bear. Now, and you've listed what will be
27 required either from existing sources or from your
28 own work. Now what I'm asking is on what proportion
29 of the rivers do you anticipate that kind of base
30 data would be required to make a realistic impact

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1
2 assessment?

3 A Well, I would say really
4 nearly all of them that do contain fish. The thing is
5 that on many of them a fairly high level of information
6 is already known. There are fewer fish species in --
7 that use those streams, the majority of the streams,
8 and many of the smaller streams are in fact without
9 fish during the winter. So we're not -- we don't
10 have to be so worried about destroying fish during
11 winter construction, on situations like that.

12 Q So do I understand that
13 what you would do is determine whether the river
14 contained fish, and then say, "Well, on those rivers
15 I'm going to need this base data."

16 A Well, we're also concerned
17 of course with rivers that perhaps do not contain fish
18 because in fact those are supplying various fish
19 food organisms to the whole system in the Mackenzie
20 Valley. We consequently, you know, would want to be
21 assured that say stream crossing techniques on streams
22 that we have not been able to find fish in, are done as
23 carefully so as not to increase silt/and one thing
24 and another as we are in other ones.

25 Q Well then, would it be,
26 and I think I'm paraphrasing what you said, would it
27 be a fair statement to say that before you can make
28 realistic recommendations you need this kind of base
29 data on almost all of the rivers that will be crossed?

30 A Well, the sort of base

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1
2 data, if you mean again what I described earlier --

3 Q Yes.

4 A -- what you were elucidat-
5 ing, I would say that is the case.

6 Q And when I say "rivers"
7 that includes streams.

8 A Yes.

9 WITNESS BOUCKHOUT: I would
10 say also, Mr. Scott, that the type of requisite
11 data rather than using base data; when we hear the
12 term "base data" or "baseline data", we really immed-
13 iately think about numbers, locations, etc. The type
14 of requisite data that's necessary, really it has
15 to be relevant to the type of use that is going to be
16 made by the applicant of that particular river, whether
17 it's going to be crossed or whether it's going to be
18 used as a water source and so on.

19 Q Well, I'm talking about
20 crossings, and that's why I asked the question of the
21 fish biologist, who will be advising you. I wanted
22 to know what he wanted before he gave his advice, in
23 the final analysis. Now, once you've obtained this
24 data, Mr Hayden, do you intend to follow up -- if I
25 can use that phrase -- with studies designed to
26 identify and rate potential impacts?

27 WITNESS HAYDEN: I think
28 we attempt to rate potential impacts all along the way.
29 I'm not exactly sure what you mean by "studies designed
30 to rate" that.

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1
2 Q Well, all right, do I
3 understand that when you've got this data you will not
4 be applying any general rating system but you will be
5 making recommendations with respect to each of the
6 rivers or streams on a site specific basis?

7 A I think it's sort of
8 a mixture of the two in a way, that we assess each
9 stream crossing on an individual basis; but some we
10 consider as perhaps more sensitive or more important
11 areas or whatever I want it. I don't want to get tied
12 up in terms of, you know, critical and this sort of
13 thing because they've been defined and I may define
14 them a different way, but I think, you know, it's
15 obvious that a stream that has an overwintering
16 population of fish downstream from the crossing site
17 has to be approached with more caution than a stream
18 that is frozen to the bottom and has no overwintering
19 crossing sites. There are additional things that have
20 to be done on a crossing like that.

21 Q All right, I think I
22 understand then. You get your data and the perusal
23 of the data really tells you fairly quickly about
24 whether this is a crossing that is going to be -- I
25 was going to say "critical" but I won't either -- that
26 is going to be of importance from your point of view,
27 and a crossing that is likely to be of less importance
28 from a fish point of view, and you emphasize, you
29 give your attention more to one than to the other.

30 A Difficult or less

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1 difficult --

2 Q All right.

3 A -- I might say.

4 Q They 're all attended
5 to but it becomes a question of emphasis after you've
6 looked at the data.

7 A Yes, yes.

8 Q Well now, apart from this
9 sort of data collection work, I think I understood you
10 to say this morning that you proposed to do or you
11 were considering the possibility of doing studies on
12 the impact of siltation.

13 A Yes.

14 Q Now that interested me
15 because it seems to me that this is potentially a
16 difference between your proposal, as I understand it,
17 and the proposal of the other applicant, that having
18 collected the data and analyzing it, you are prepared
19 to develop programs that will analyze generalized
20 problems, in an experimental way.

21 A I think/ ^{they} will maybe
22 add definition to the problems in that the sort of
23 studies that I was considering, am considering would
24 better define the problem so we can be more accurate
25 on our assessments in these sort of things. For instance,
26 the winter silt study. The basic situation is that
27 usually silt is -- siltation occurs usually during
28 a period of lowest flow to the greatest extent, and
29 that of course would probably be in the winter on most
30 streams, and that's when construction is occurring. Now

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1
2 we want to see if that, you know, sort of the extent
3 of the deposition of silt and these sort of things so
4 we can be more accurate on saying whether a crossing
5 on a particular site would be particularly harmful or
6 that additional measures should be taken to reduce
7 siltation.
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Q I am a layman here
and just see if I understand what that means. While
that study is obviously going to be conducted on a
particular river at a particular time, I take it that
it is designed to produce information that will tell
you -- that will give you some generalized information
about the impact of sediments or silts that may
be applied well beyond that river and indeed in your
whole work.

A I think that is right
although it would have to obviously be applied with
caution to all the other rivers.

Q Right. Is one of
the purposes of this to move toward the establishment
of tolerance levels, for instance, in that case, with
respect to eggs and benthic organisms?

A I think it is in that
direction, although I don't think it would answer
that question, you know, in entirety at all.

Q Yes.

are
A What you're talking about in
that case, I think, is a rather long and involved
series of experiments to determine the tolerance
levels for, as you said, eggs, to siltation.

Q Well, is that kind of
experiment apart from telling you something about the
operation of sediments or silts in a given situation,
is it designed to tell you something about the tolerance
levels of fish? Is it moving in that direction?
Is that why you -- is that one of the reasons

1 you would begin on this kind of experiment?

2 A Well, I think that
3 we would probably use the information initially to
4 make judgments that aren't quite that scientific.
5 By that I mean that I think a number of things --
6 we make a number of assumptions, that additional
7 silt into water under ice is, you know, can do a number
8 of things rather than physically damage the
9 fish. There may not be fish eggs there, it could --
10 we know that in fact the siltation affects in-
11 vertebrate populations in streams. We know that in
12 fact if the silt is of a particular nature or has a
13 high organic content, it can put a certain demand on
14 the oxygen of that stream, and I think that we will
15 be looking at those sort of things, you know, to
16 interpret there, to see how far the silt in fact
17 carries downstream and during certain velocities
18 under ice, and we would probably^{be}/measuring such things
19 as oxygen under ice before and after induced siltation
20 under ice.

21 Q Now, apart from this
22 study, have you been considering other kinds of
23 experimental studies of that type?

24 A None that come to mind
25 right now.

26 Q For example, have you --
27 this may have come to your mind and perhaps I can
28 jog it. Have you given any consideration to
29 experimental studies, for example, on the effects of
30 methanol?

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1 A Well, I would agree --
2 well, I think that I would agree, as I recall, with
3 Dr. McCart and some of his testimony about the effect
4 of methanol, in fact all of the answers certainly
5 aren't known. Presently I am looking at some --
6 preliminarily looking at the composition of the
7 industrial graded methanol that will be used and
8 one thing and another like that. Some information
9 is known of the effect of methanol on some aquatic
10 organisms already. I think, ideally, in an experiment
11 like that, these sort of experiments have crossed
12 my mind. I guess I just haven't been able to see
13 how it could be properly done, but the possibility
14 of a methanol spill into water would involve,
15 perhaps, if it is an accidental spill, something
16 like a solution of 10% to 20% methanol, and we know
17 that that is going to be toxic to a good amount
18 of aquatic life, so we don't have to experiment to
19 find that out. I think really what interests me
20 more than anything is what else will be in the test
21 solution other than methanol. If there is something
22 about the pipe coating or --

23 Q Let me say why I
24 emphasize this, we have had a lot of evidence about
25 collecting base data and counts and finding out where
26 the fish are and all that sort of stuff, and that
27 is, you have acknowledged to be important and have
28 told us that you will be doing that. I was
29 particularly interested in your statement that I
30 think went further than any of the evidence that we

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1 have heard so far, that beyond that you thought
2 that there was some virtue in experimenting on
3 things like siltation in a given situation to find
4 what the process is, what happens, what its effects
5 are.

6 Now, do you think, for
7 example, that there is any virtue in running such
8 experiments with respect to the test fluid or other
9 fluids or oils or chemicals that may or may not
10 be used by your applicant?

11 A I think it would be --
12 I think that there is merit in doing that as long
13 as the results of the experiment lead to some way
14 to avoid the particular problem and right off the
15 bat I can't see a way to avoid the use of methanol
16 in testing situations. I don't know if an experiment
17 of that nature would really further the safety of
18 the line or the construction of the line.

19 Q I noted this morning
20 your observation that you don't like to kill fish.
21 I think the word perhaps is lethalyze them, but isn't
22 there some virtue, recognizing that methanol cannot
23 be avoided, in determining the lethal or even the
24 non-lethal damage that may result with respect to
25 certain concentrations of methanol or other chemicals?

26 A Well, yes, I think there
27 is certainly merit in that, but I think that in many
28 cases those levels are known, you know, and I
29 unfortunately cannot quote what they are right now,
30 but there is some previous work other than that done

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1 by Aquatic Environments on what concentration of
2 methanol kills fish. I think the Aquatic Environ-
3 ments work has demonstrated that there are adverse
4 effects of .01% methanol on fish eggs and fry develop-
5 ment.

6
7 Q Are you giving consider-
8 ation to doing experimental work, for example, on the
9 swimming velocity of fish, or particular kinds of
10 fish?

11 A I think that, too, has
12 been done pretty well.

13 Q YOU don't see the
14 necessity for that ?

15 A NOT really. I wouldn't
16 put that high on my list right now, no.

17 Q Have you given any
18 consideration, or will you give consideration to
19 experiments dealing with the consequences of blasting
20 under ice?

21 A If there is a possibility
22 of, in fact, blasting under ice, I think that I would
23 obviously first try to find out if any experimental in-
24 formation is known about those effects, and then if
25 there isn't and there is going to be blasting under
26 ice, I would be very interested in that sort of thing.

27 Q All right, well now I
28 have set you up for one request for a grant from the
29 applicant. Are there any other areas that at the
30 moment occur to you as being areas of possible experi-
31 mentation that should be undertaken, or at least should

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1 considered?

2 A Another area that I
3 -- I don't -- I get sort of lost sometimes in defini-
4 tion of whether it is experimental or base line and
5 this sort of thing, but another general topic, more
6 or less, that I think that we don't know enough
7 about, and this may be, in fact, regarded as experi-
8 mental in nature, is to find out really on streams that
9 are freezing to the bottom in the winter, where
10 various aquatic invertebrates are in those streams,
11 if they are in the subsurface area where there is
12 liquid water, or if they have somehow moved out,
13 or if there is a high mortality of these insects in
14 those situations, and we intend to go after that
15 sort of information, too, this winter, probably
16 with a shovel and a pick, more or less.

17 Q Maybe I misread what
18 you are saying. Are you really contemplating any
19 experimentation or is it all site specific examination?

20 A We are contemplating
21 certainly experimentation on the water siltation,
22 because it doesn't seem to me to be a terribly
23 complicated experiment that we are looking at. It
24 will take some work to dig holes in the ice downstream
25 from an area and find a suitable location to do that
26 in, and measure velocities, measure suspended
27 sediments as we introduce silt from above.

28 Q If you, in the course
29 of your work consider the advisability of other
30 experimental work of that general nature, I take it

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1 that you will let Mr. Bouckhout know because he
2 will have to pay for it and that he will let us
3 know when it has been decided to do it. Is that
4 fair, Mr. Lutes? -- The answer is yes.

5 Well, now, have you given
6 any thought to participating in what I have been
7 advised is generally called bioengineering experiments,
8 that is, experiments designed to test engineering
9 solutions from the fish point of view. Let me
10 just precede that by another observation. Your
11 design panels for Foothills, and the design panels
12 for Arctic Gas have listened to concerns registered
13 and have suggested design solutions which they say
14 will take care of those concerns. Some of them
15 are traditional and others are novel. It occurs
16 to me that this may be an area in which there should
17 be some combined experiments between biologists and
18 engineers to give us, in advance of construction,
19 some assessment about whether those solutions will
20 meet the problem. Have you given any thought to
21 that?

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1 A Yes, and I think probably
2 the first thing that comes to my mind anyway, in a
3 situation like that is the interruption of the sub-
4 gravel flow during winter by the frost bulb effect
5 of the chilled pipe, and I think that the last panel
6 that was up here discussed that, or perhaps it was in
7 the transcripts I read this, that one suggested solution
8 was to put insulated culverts buried into the stream
9 bed to allow sub-gravel flow to continue to downstream
10 areas. I think that sort of approach should be tested
11 experimentally before it's adopted universally for
12 allowing things. However, I think there are probably
13 alternate procedures that could be used but may not
14 require experimentation.

15 Q Yes, but if that procedure
16 is the design procedure that is developed by the
17 engineers, I take it it's going to be terrific if it
18 works and it's going to be pointless if it doesn't,
19 and would you agree that if that is the procedure that
20 is adopted that it should be tested?

21 A I ~~would~~ say in that parti-
22 cular instance, yes.

23 Q Well now, one other area
24 that I suggest to you, Mr. Claridge spoke of digging
25 by-pass channels to reduce the impact on aquatic
26 life while you were building river crossings. Now do
27 you understand what I am trying to talk about? It
28 occurred to us that that might have serious siltation
29 consequences, it might not; but is that the sort of
30 thing that perhaps should be tested at the site by

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1 biologists and engineers together to see

2 (a) whether it can be done;

3 (b) whether, what its biological effects are.

4 A Well, Mr. Scott, I had
5 the same initial reaction that you did to that sugges-
6 tion and I talked with Mr. Claridge following that, to
7 have him explain it a bit more and I think what he had
8 in mind, though, what I came away with, the impression
9 I came away from him with, was that he intended to use --
10 he was describing basically a braided stream system,
11 where water could be channelled from an active channel
12 to at that point in time an inactive channel or a
13 non-flowing channel in the active flood plain of a
14 braided system, and this would already be a water-
15 silted area so you wouldn't be introducing additional
16 silt, and we came to the agreement that whichever manner
17 was used it wouldn't add more silt than not using that
18 technique at all. There's also the possibility, of
19 course, of using culverts to allow flow to continue
20 over the excavation.

21 Q Well, what I think you're
22 telling me is that Mr. Claridge perhaps has backed off
23 from what he said to us or has qualified it so that
24 it doesn't mean digging a channel at all. It means
25 simply diverting to an existing water course.

26 A Well, I think in fairness
27 to Mr. Claridge, that that may require some digging to
28 divert the water into a channel, but it wouldn't be a
29 major excavation.

30 Q But if the design that I

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1 understood him to speak of were seriously contemplated
2 as a design solution, is that the kind of area where
3 bio-engineering experiments would be useful?

4 A Well, I think so, but I
5 think as we both probably initially perceived that
6 technique, I don't think it's a very good technique.

7 Q All right. Well now,
8 are there other areas where this kind of combined
9 effort might be useful?"

10 A Well, it had occurred to
11 me at one time it would be good to know ahead of time
12 what sort of sub-gravel flow maybe in a particular
13 stream which may cause trouble in the excavation of a
14 line through a particular channel, and if you knew
15 that ahead you could do something, although I hadn't
16 really figured out what you could do to allow that
17 sub-gravel flow to continue, supposing that further
18 downstream there was an exposure of that ground water
19 in an overwintering area. I know of no places on the
20 line right now, perhaps because we haven't done winter
21 surveys yet, where that situation occurs, and maybe
22 it's very hard to locate that. So I thought that
23 perhaps an area like that, geotechnical people and
24 biologists together could work on a particular thing.
25 But I've been told that that would be perhaps a very,
26 very difficult thing to test for the sub-gravel flow
27 in the middle of the winter. You would probably
28 require a drill rig and a number of other things
29 like that. Perhaps a better solution to
30 that would be make those sort of crossings as quickly

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2 as possible.

3 Q Do you see any virtue
4 in testing some of the land base erosion control devices
5 that will be placed adjacent to streams and rivers?

6 A Well, I think that^{if} the
7 geotechnical people or whoever is giving advice on that
8 are not confident that the method they're recommending
9 will work, I think there probably is. I think it's
10 really an engineering experiment we're talking about
11 more than anything there, although I obviously have an
12 interest in that sort of thing so that -- well, so
13 as to minimize the amount of siltation that would
14 occur in a stream .

15 Q Well, we've been told that
16 there will be such things as coffer dams, weirs,
17 settling ponds, siltation curtains, and a number of
18 those things have been used and are -- their efficacy
19 may be known but others perhaps are less well known,
20 especially in northern areas, and what I'm getting at
21 is, is there any virtue to testing these things on
22 a site to see if the engineers are right and if the
23 biological effects of the solution are as predicted,
24 or within permissible limits?

25 A Well, I think that almost
26 any situation that -- or any technique that there is
27 a lack of confidence in, should certainly be tested.
28 I would, you know, if they do in fact test it, if
29 geotechnical or engineering people are not confident
30 of their particular silt control technique and they

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1 do test it, I would certainly want to be involved with
2 the, you know, with that experiment.

3 Q You see, the trouble is
4 it seems to me that there's -- and this may apply in
5 other disciplines -- that there's a gap here. We're
6 working not for the first time but almost for the first
7 time in the northern environment and the biologists
8 are listing their concerns and the engineers are saying,
9 "Well, don't worry, we have a solution for that, you're
10 not going to get silt in your river or you're not
11 going to get it above the permissible limits."

12 While that may be so, is there
13 not a gap because we really don't know, in the way
14 engineers and biologists are used to knowing, by exper-
15 ience. I'm not saying that you should build the whole
16 pipeline in order to test it; but is there not some
17 virtue in selecting solutions that are important from
18 a biological point of view and seeing if they work as
19 predicted, and if they work as predicted, what their
20 biological consequences are?

21 A Well, I think so. That
22 might not necessarily require a field experiment to
23 determine that. In many cases the Alyeska line has been
24 used as an example of where these sort of things can
25 be tested or observed, so that's something of a proving
26 ground now. I think other lines such as the Pointed
27 Mountain Line can be used in a similar way, and I
28 think - well, perhaps, I don't know if common sense
29 is the proper term to use to describe it, but to be
30 able to think out a particular situation and see what

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1
2 the likelihood of a success or failure of a technique
3 is, I think you can judge that to a degree by just
4 thinking about it. Some suggested solutions to some
5 of these problems may in fact be entirely out of the
6 question, you know. It's just not very reasonable.

7 Q Now, could I ask you
8 to turn to paragraph 5 of your evidence, the last
9 full sentence on that page after you've taken a
10 little jab at Arctic Gas in the first part, and we'll
11 let that go by for the moment, you then say:

12 "Foothills has recognized potential conflicts
13 between pipeline related activities and fish
14 harvest."

15 Now, I take it that that means that ~~apart~~ from Foothills,
16 you have recognized potential conflicts. Have I got
17 that right?

18 A Well, to a degree,
19 although I wasn't involved in the initial writing
20 of the environmental statement where that protection
21 measure is contained.

22 Q All right, what does
23 that part of the sentence mean? I don't understand that

24 A Well, I wrote it to
25 mean that Foothills realizes that there is a potential
26 for conflict with commercial or domestic or sport
27 fishing in their pipeline, not only the construction
28 activities but the post-construction activities, and
29 perhaps even pre-construction activities. There is the
30 potential for/^{conflict with} those fish harvest means.

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1
2 I don't know if that clarified it at all.

3 Q So you mean by that or
4 Foothills means by that that the potential for fish
5 harvest maybe affected by construction or post-
6 construction of the pipeline.

7 A Well, that there is a
8 potential conflict there, in fact a pipeline
9 related activity may interfere in some way with fish
10 harvest.

11 Q All right, and then you
12 go on to say:

13 "And Foothills has formulated protection
14 measures aimed at avoiding conflicts with
15 domestic, commercial, and sport fishing."

16 Now the only protection measures I could find in the
17 application are found at paragraph 5.7.3.8. Can you
18 get that in front of you? It's page 5-D-5.39.
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A Yes.

Q Now, there you have four protection measures and just at random, let's take the third, and for the benefit of others who don't have it in front of them I will read it:

"Any boat traffic commissioned by the Applicant will be directed to avoid interference with nets or the fishing activities of native or bona fide fishermen."

Well, now, I recognize that at a certain stage one must be general in response, but is that where we are now in terms of formulating protective measures to deal with this supposed impact?

A I would say yes. I don't really understand your question, I don't think though.

Q Well, in your transcribed evidence you point out what everybody recognizes, the possibility of this conflict which is going to have serious or may, underline may, have serious results for people who fish commercially or otherwise, and I am looking for these protection measures and basically I come across four which are really -- well, I could have written them myself. I mean, you won't run into any boats or any nets. Is that where -- I am not saying that that is the end of the analysis --

THE COMMISSIONER: It's high praise indeed --

MR. MARSHALL: I think it may be questionable, sir.

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1 MR. SCOTT: I am a little
2 troubled about the reference to bona fide fishermen
3 because it suggests that determination will be made
4 about a fisherman who isn't bona fide -- but we will
5 leave that aside. -- Though I have some contenders
6 for that exception.

7 But is that where you are
8 at in formulating protection measures?

9 A Well, I interpret this
10 sort of thing. As we have said before, Mr. Scott,
11 I think that protection measures are going to be
12 refined in one thing and another. Now, I used this
13 particular protection measure in making an assessment
14 of, say, perhaps a wharf site that is proposed at
15 a river mouth or something like that, and I bring it
16 to Foothill's attention in a case like that, that they
17 could well interfere with domestic fishing nets by
18 having a wharf site there and that they have a
19 protection measure saying that they will not interfere
20 with those nets.

21 Q Well, perhaps I have
22 it then. Are these protection measures formulated
23 not by you, but by Foothills in response to concerns
24 that you have elicited or lined up?

25 A No, I think these
26 are protection measures formulated by Lombard North
27 Group before I was working for Lombard North Group.

28 Q I note one other
29 one, and again it is the same problem. The applicant
30 will schedule his activities so as not to coincide

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Whitney, Kondla
Cross-Exam by Scott

1 with fisheries operations -- well, that sounds
2 all right -- or he will negotiate a schedule with the
3 fishermen if coincident use of a location is
4 required.

5 Now, what is envisaged
6 by that?

7 A I assume that probably
8 if there is a situation where there is a fishery
9 going on and the scheduling of pipeline construction
10 coincides with that fish use, and if Foothills finds
11 it impossible to change their schedule for one reason
12 or another or a number of reasons, that they will
13 then negotiate with fishermen for some sort of
14 mitigation in this case.

15 WITNESS BOUCKHOUT: I
16 might add to that list, Mr. Scott, that in the
17 table appended to our evidence, one of the recommend-
18 ations made by Lombard North in regards to Milepost
19 550, Hodgson Creek, a recommendation was made to
20 possibly relocate that location since there was a
21 possible spatial conflict with domestic fishing at
22 that location on Hodgson Creek.

23 Q Well, I have only
24 taken this as an example of a raft of proposals that
25 are contained in the application and about which
26 I have no general quarrel. But do you agree with
27 me that to devise a meaningful scheme, a substantial
28 amount of refinement of these protection measures
29 is obviously required as you move along?

30 WITNESS HAYDEN:

A Well, I think that we

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1 intend to do that, although I don't know if we can
2 write a protection measure that will deal exactly
3 with every situation. I think that is left to our
4 sort of site specific assessment in some cases.

5 Q No, but I suppose the
6 point that I am making is that whether you wrote
7 the evidence or the statement or not, when the
8 evidence comes forward that you formulated protection
9 measures and therefore the fisheries people out there
10 needn't worry and it turns out that the protection
11 measures are so general that they may want to begin
12 to worry. But as long as I have the understanding
13 that this is only the beginning and that there will
14 be substantial refinement of these measures so that
15 they are reduced to some meaningful form, would that
16 be fair, that that is going to occur?

17 A I think so, yes.

18 Q Mr. Bouckhout will let
19 us know about those as they are developed in the
20 process, I take it.

21 WITNESS BOUCKHOUT: Yes,
22 I think that that is most fair, Mr. Scott. We have
23 said repeatedly that the protection measures as
24 identified in the Environmental Statement were a
25 first case basis to work from. They would be
26 refined, not only will the measures, per se, be
27 refined, but they will be applied to the actual
28 circumstances on the ground. In other words we will
29 do an assessment of the line along the way, using
30 air photo mosaics and so on and we'll apply the

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1 measures where we feel necessary.

2 Q I take it that in
3 order to do that, Mr. Finney, you will want to
4 develop -- I am sorry, Mr. Hayden, you will want
5 to develop some knowledge, some fairly detailed
6 knowledge about fishing areas and fish harvest and
7 that sort of thing so that you will be able to
8 develop these regulations?

WITNESS HAYDEN:

9 A Yes.

10 Q And that is the
11 kind of knowledge, just by the by, that will be useful
12 not only to yourself but to others who have the
13 responsibility of developing game management plans
14 and so on?

15 A Well, I think that they
16 could be used. I think that you are probably well
17 aware of the difficulty sometimes in getting very
18 accurate information about domestic harvest. A
19 large number of areas, a great number of areas on the
20 Mackenzie Valley have been identified as domestic
21 fishing sites and they are used sometimes intermittent-
22 ly, and sometimes not for two or three years.

23 Q Well now, just in
24 point form, or perhaps later in writing if you prefer,
25 could you let us have the research design and re-
26 search program for the work that you contemplate
27 doing on the substantial laterals?

28 A I could give you what
29 I proposed there.

30 Q Could you do that now or

1 would you rather do it later?

2 A Well, it would probably
3 be better if I waited until later, it would be a
4 bit clearer. I could describe generally what we will be
5 doing on the lateral.

6 Q Oh, I would be content
7 to have you do it later with one proviso that I
8 hope you make it as specific as you can, though
9 not necessarily with reference to site, so I won't
10 be able to think of any questions to ask you about
11 it.

12 A I will try.

13 THE COMMISSIONER: I would
14 appreciate that.

15 MR. SCOTT: Well, now, I
16 would like to ask some questions about the route and
17 though I have questions dealing with a number
18 of areas I am going to confine myself to only
19 a few of them, you will be glad to hear, and I
20 ask Arctic Gas to listen, because in certain cases
21 these are areas that parallel their route.

22 The first is the junction
23 of the line at the Taglu plant, and that is found
24 on Environmental Map which is sheet 1 of 16.

25 THE COMMISSIONER: Let's
26 stop for coffee and we will get these maps out over
27 coffee and come back.

28 (PROCEEDINGS ADJOURNED)
29
30

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT: Mr. Commissioner,
just before we begin, I have a short announcement.

Yesterday was a special occasion which was overlooked because it represented the 99th volume of formal hearings transcripts of this Inquiry. I suppose a triumph of sorts for us, but certainly a triumph for the Court reporters, and it represents today the longest Inquiry in which they have ever participated -- the 100th volume of transcript -- and so they will not face a long, cold winter on Unemployment Insurance, or indeed a long, cold spring on Unemployment Insurance, I am able to predict with certainty the prediction will be proved out that they will hit 200 before they are through, even excluding community hearings transcripts.

They have worked very hard under the most unusual hours about which they have only complained, I think, three or four times a week.

(LAUGHTER)

And on behalf of all the participants who have made this little gift possible, I would like to present them with a bottle of champagne that I hope they will consume tonight after the transcript for tomorrow is ready.

So, Mr. Bemister, if you are around, you can-- I am a little reluctant to give this to Mr. Bemister because I rather fear that the people who are here every day may not benefit from it to the full, but I hope he will look after that for us.

(APPLAUSE)

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1
2 M R. SCOTT: Could we turn
3 to sheet 1 of 16 on -- in the environmental maps and
4 Mr. Finney, do you have that in front of you? I'd
5 like to ask you something about it. The "M" we see
6 on the left-hand side of the map is, of course, the
7 terminus and the Taglu Plant, is that correct?

8 WITNESS FINNEY: Yes, it is.

9 Q Now, are you aware or
10 is anyone on the panel aware that the Taglu Plant is
11 located within the Kendall Island Bird Sanctuary?

12 A Yes.

13 Q And I take it, Dr.
14 Finney, it's recognized that the sanctuary and the
15 adjacent area is an important area for fish, swans,
16 and geese, both in terms of nesting and nursery purposes.

17 A I can't really address
18 myself to the nesting of fish.

19 Q All right.

20 A It is for swans
21 regularly, and for geese sporadically.

22 Q Yes, and indeed an
23 exotic note, I take it that it's one of the few
24 areas in the world where they have Hudsonian godwit
25 nests?

26 A The distribution of the
27 Hudsonian godwit is under some question. It breeds in
28 fair densities in this area and in fair densities
29 around the Churchill, Manitoba area.
30

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1 Q And I guess with Taglu
2 there it's probably looking for new space; but that is
3 where Taglu is and of course that is where the line
4 must begin. Now, I take it that there is also a scrubbing
5 plant that is adjacent to the Taglu field.

6 A I don't know.

7 Q Well, maybe it is, let
8 me ask you that. Is that the scrubbing plant where
9 you take delivery of your gas?

10 WITNESS BOUCKHOUT: Yes, I
11 believe there is a scrubbing plant at the delivery
12 point.

13 Q Well now, I am advised
14 that the limits of the Kendall Island Bird Sanctuary
15 are some eight miles south-east of the point "M".

16 A If you look on our map
17 which is in the same book entitled,

18 "Land use in special areas,"
19 sheet 1 of 16, it shows the location of the bird
20 sanctuary in relation to the Taglu plant.

21 Q And it appears that
22 the scrubbing plant is just inside the sanctuary. Isn't
23 that correct.

24 WITNESS FINNEY:

25 A That's the way the map
26 shows it, yes.

27 Q And you would recognize
28 that a scrubbing plant is in fact a big, noisy industrial
29 type operation.

30 A I assume it is.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 Q Are you aware of any
2 reason why the scrubbing plant must be located within
3 the bird sanctuary?

4 A I'm afraid that's out
5 of my field, I don't know.

6 Q Mr. Bouckhout?

7 WITNESS BOUCKHOUT: Well, sir,
8 I am aware of the reason why the scrubbing plant has
9 to be located very near the delivery point . I'm not
10 aware of the particular reason why it has to be
11 located within the Kendall Island Bird Sanctuary.

12 Q Are you aware of any
13 reason why it could not be located, as I understand
14 it, some eight miles distant, which would put it out-
15 side of the sanctuary?

16 A Personally sir, no.

17 Q No. Dr. Finney, do you
18 agree that if possible that would be a desirable
19 thing from the point of view of birds?

20 WITNESS FINNEY: There are
21 two ways I'm going to answer that. First of all, I
22 think that one has to hold bird sanctuaries or wildlife
23 sanctuaries in general inviolate as much as possible,
24 and therefore on that basis I would suggest that
25 getting outside of the bird sanctuary would be a good
26 idea. However, bird sanctuaries or any other sanctua-
27 ries tend to be finite lines drawn through a continuum
28 of wildlife density. It's probably so in this case and
29 therefore with respect to the absolute affect on bird
30 populations it might not make that much difference.

Bouckhout, Hayden, Finney
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Cross-Exam by Scott

1 Q Well, let me ask you
2 this. Where do you put the high density of bird interest,
3 inside the sanctuary or outside?

4 A I would say that the
5 Mackenzie Delta as a whole is an area of high bird
6 interest. But as I said --

7 Q Dealing with this
8 particular area, what is the area that you would
9 like to protect if any, in this, as shown on this map?
10 Surely it's the area within the sanctuary.

11 A As I said, I think that
12 in general principle, major operations within a sanctuary
13 should be avoided simply because it is a sanctuary.

14 WITNESS BOUCKHOUT: Another
15 way of looking at this, of course, as well is that
16 by locating a scrubbing plant very near the actual
17 production plant, you have centralized and localized
18 your activity, whereas if you moved one eight miles
19 away you suddenly have two full-sized activities.

20 Q Well, Dr. Finney, aren't
21 there in addition bird concerns that are just outside
22 the sanctuary border to the south-east in the lowlands
23 that are shown on that map?

24 WITNESS FINNEY: Well, we're
25 generally concerned with what could be classified as
26 good waterfowl breeding habitat, relatively high shore-
27 bird breeding habitat, as well as breeding of some
28 passerine species. We're also concerned with migration
29 and staging areas -- moulting and staging areas, rather.

30 Q Well look, if you moved

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1 the scrubbing plant, if it were possible to move the
2 scrubbing plant eight miles further down, you can see
3 where that would bring it because you see Milepost
4 10 there. I understand that would put it on higher
5 ground out of the bird sanctuary and above the sort
6 of marshy land that you agree is an important bird
7 area just adjacent to the sanctuary. Now, from a bird
8 biologist's point of view, isn't that a desirable
9 thing if it can be done?
10

11 A I think that the lowland
12 and wetland areas in the delta itself are the areas
13 that are most sensitive. I agree with you there.

14 Q So wouldn't you rather
15 have it at Milepost 8 than where it is?

16 A I would have to look at
17 it more closely in terms of data and exact distribution
18 but that would be my initial impression.

19 Q Well, from your present
20 information have you made any recommendation, are you
21 going to make any recommendation about that?

22 MR. LUTES: Mr. Commissioner,
23 the location of that plant is the decision which is
24 made by the producer that built the plant. We would
25 be delighted to terminate the pipeline eight miles
26 shorter and save eight miles of pipe.

27 MR. SCOTT: Well, I understand
28 that the scrubbing plant is the property in this case
29 of Imperial Oil.
30

MR. LUTES: Yes, it is.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 MR. SCOTT: I don't make any
2 bones about that. It's obviously not owned by Foothills.
3 What I'm concerned to determine, in view of information
4 that we may be obtaining in the delta phase, is whether
5 there is, from an avian biologist's point of view any
6 virtue, if it is possible, to move that scrubbing
7 plant eight miles down the line?

8 A Well, as you have already
9 established, Mr. Scott, there is virtue in getting the
10 plant to higher ground as that avoids the most
11 sensitive areas in the delta. There is also the dis-
12 advantage, as Mr. Bouckhout has pointed out, that if
13 you have two full sites of activity. As a result then
14 one might be introducing problems, so there would be
15 a certain amount of tradeoff.

16 Q All right. What would
17 your view be? You've given me two alternatives. Which
18 do you select as an environmentalist, or are you in
19 any position to say?
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1 A I don't feel that I am
2 in a position to say right now, sir. I could look
3 at that more closely, if you like.

4 Q I would appreciate it
5 if you would do that and let me know through your
6 counsel.

7 A All right.

8 Q Well, now, I should
9 emphasize, Dr. Finney, that I asked that question
10 because I understand that the scrubbing plant
11 can only be located there with the permission of the
12 Canadian Wildlife Service and I would therefore
13 appreciate the views of an avian biologist, essentially
14 on the question of whether that permission should
15 be given or whether they should be told to move it
16 eight miles up the line, from a biologist's point
17 of view.

18 Well, now, the second area is
19 Holmes Creek which is found on the main line routing
20 in the bigger volume. Well now, I understand that
21 the map in front of us, at the river, shows the
22 crossing as presently applied for, have I got that
23 right?

24 WITNESS BOUCKHOUT: I believe
25 that is correct, as I recall, Mr. Mirosh or someone
26 on a previous panel had indicated that there had
27 been a drafting error in this particular area, but
28 I would proceed on that basis.

29 Q Well, now, recommendation
30 number two, made by the environmentalists on your

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1 table, Mr. Bouckhout, indicates that, and I am
2 quoting, "relocate eastward to avoid immediate
3 creek area." Now, the creek that is referred to
4 is Holmes Creek, isn't it?

5 A That is right.

6 Q And that is the
7 white line that comes in on the right-hand side of
8 the river just above the pipeline, is that right?

9 A Right.

10 Q Yes, and so I take
11 it that the proposal that the environmentalist has
12 made is to move the crossing down stream some distance
13 beyond the entry of Holmes Creek?

14 A Downstream on the
15 Mackenzie east channel, that is right.

16 Q And then where is
17 it proposed to take it?

18 A I believe the proposal
19 by the biological consultants was to move, as you
20 say, the east channel crossing downstream on the
21 Mackenzie and to proceed with the line, I would
22 say, I guess, east of Holmes Creek and continue on
23 east of Holmes Creek. I don't recall exactly where
24 their relocation recommendation actually placed the
25 line. It was a fairly general relocation recommenda-
26 tion, in which case they did not actually put a line
27 on the map. They made the general recommendation
28 that the line be moved out of the immediate vicinity
29 of the creek.

30 Q Well, if you follow

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Whitney, Kondla
Cross-Exam by Scott

1 Holes Creek upstream, I see that it goes on a
2 very substantial distance along that alignment
3 sheet.

4 A Yes.

5 Q And it is likely,
6 isn't it, therefore, that the result of that proposal
7 is that at some point you will have to cross
8 Holmes Creek to rejoin the line as shown on the
9 map?

10 WITNESS HAYDEN: Mr.

11 Scott, maybe I can answer that. Our recommendation
12 was to move east of Holmes Creek and this would
13 eliminate a crossing of Holmes Creek. The headwaters
14 of Holmes Creek is in the Wolverine Lakes area further
15 to the west and to the southwest, so it was our
16 recommendation to entirely avoid crossing Holmes
17 Creek with the pipeline.

18 Q Well now, I take it
19 that one of the reasons Holmes Creek is important is
20 that there is a recently established fishery there
21 of which you are aware?

22 A That is one of the
23 reasons, yes.

24 Q What are the other
25 reasons?

26 A It appears to be an
27 important area for fish spawning. We caught and other
28 investigators in the area have caught a large
29 variety of fish in the area. It has lake trout,
30 inconnu as well as white fish species. It is also used as

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Cross-Exa, by Scott

1 something of a sport fishery although I think we
2 put less weight on that as being important. It is a
3 domestic fishing area also as well as commercial .

4 Q And Mr. Finney, this
5 was essentially your recommendation, was it?

6 I am sorry, Mr. Hayden, I apologize.

7 A Well, it was a combin-
8 ation of my recommendation and Dr. Whitney's recom-
9 mendation and the other fisheries biologist who
10 was at that location. I, myself, was personally
11 not at Holmes Creek, but the other fisheries biologist
12 that works with me was there.

13 Q Well, I suggest to you
14 and perhaps the other environmentalists can help, that
15 by moving it in the direction which you propose,
16 you essentially move it away from the creek, I concede,
17 but into a relatively important mammal and bird
18 area. Swans, the northernmost limit of beaver
19 populations, and an important nesting area for
20 other waterfowl.

21 WITNESS BOUCKHOUT: Yes,
22 these constitute the inherent tradeoffs that have to
23 be considered when you are talking about line
24 relocation.

25 Q All right, well now
26 did the other environmentalists accept that relocation
27 or is it being discussed or what?

28 WITNESS FINNEY: Mr. Scott,
29 from my ornithological point of view one of the
30 primary concerns with the Holmes Creek was that a pair

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1 of peregrine falcons were spotted in the area that
2 had not previously been known. Their status was
3 not definitely determined, but from talking to
4 the people that were there, and they described to
5 me the behaviour, it would suggest that a nest site
6 might have been in the vicinity, and this is viewed
7 as a very serious problem.

8 Q Well, do I understand,
9 Dr. Finney, that you accept this movement, this
10 relocation?

11 A I would think that
12 what is going to have to be determined is exact
13 status of those birds. As I say, by their behaviour,
14 it appeared that they were nesting, in that they,
15 from the reports that I got, they showed a great
16 interest in the people in the area and were moderately
17 aggressive which is characteristic of a pair
18 holding territory, rather than a pair of non-breeding
19 birds, say, that are just out hunting, in which case
20 they would have moved away. I think that --

21 Q Could I bring you
22 to my question? I don't want to shorten you if it
23 is important and you can go on. What I would like
24 to know, if it is possible to tell me, is whether
25 you accept this movement, reject it, or are presently
26 unable to say?

27 WITNESS BOUCKHOUT: You
28 will note, Mr. Scott, that the recommendation is
29 noted as being "approval pending further environmental
30 or geotechnical information."

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Cross-Exam by Scott

Q Yes, well, that may
mean that Dr. Finney isn't able to say.

WITNESS FINNEY: I think
that what I was trying to say is I want to know
whether they are nesting or not, or whether
this just happened to be a casual pair that were
floating through the area, which is going to be im-
possible to avoid.

THE COMMISSIONER: Well, you
thought that they were nesting. Your impression
was that they were nesting --

A That wasn't my impres-
sion, that was the impression of the -- their behaviour
suggested that they may be nesting. I would want to
confirm that status.

Q If they were nesting
then what would you recommend?

A If they were nesting
I would think that I would recommend moving the
alignment.

MR. SCOTT: Two and a half
miles?

A Well, that depends where
they were nesting.

Q What about the swan
and other waterfowl? Do you know enough to determine
whether you should approve that recommendation, or
is it too early to ask you?

A It is too early to
ask me.

Bouckhout, Hayden, Finney
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1 Q Now, about mammals,
2 is it too early or has a determination been made
3 as to whether that relocation should be approved?

4 WITNESS WHITNEY: I have
5 been very convinced all along, this primarily was
6 my recommendation in the first place, and due to the
7 combination of factors, I felt that it should be
8 moved and I still feel that it should be moved and
9 exactly where it should be moved, I think this
10 will -- we have suggested a line, but there are
11 geotechnical problems with the place where we moved
12 the new line that are going to, despite our efforts
13 to work closely with the geotechnical people are
14 going to have to await drilling samples.

15 Q Well, let me ask you
16 this, have any of you considered moving the
17 line in the other direction, because you will note
18 that there is already there a Gulf exploration camp
19 and air strip that I think is shown on the map and
20 wouldn't it be better to go by that, consistent
21 with the principle that there is there a disturbed
22 area and we should use it, if possible?

23 A Yes, I considered
24 that, and the main problem as I see there is the
25 drainage configuration and the headwater lakes,
26 Wolverine Lake or there is a series of Wolverine
27 Lake and I am not too sure, Peat Lake is in the
28 headwaters as well, and due to the configuration in
29 the headwaters swinging to the southwest, it would
30 take a considerable jog, I don't know, I would say in

1 the neighbourhood of maybe extending the line --
2 maybe 20 miles and I think that that would disturb
3 much more area than if we could just move it to the
4 east.
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Bouckhout, Hayden, Finney
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Cross-Exam by Scott

1 Q Well now, let's take another
2 example to see how the thinking runs. Between Mile 90
3 and the Thunder River at Mile 170, if you look at
4 the colored map, I think--

5 THE COMMISSIONER: What sheet
6 is that?

7 MR. SCOTT: Well, sir, the fish
8 and bird map I'm looking at, sheet 2 of 16 and sheet
9 3 of 16, actually on sheet 3 of 16, but dealing with
10 about Milepost 90 there if you move down you'll see
11 the Dempster Highway or the new proposed Dempster Highway
12 -- do you see that?

13 A Yes, I do.

14 Q Now I'm advised that
15 at about that point, running all the way over to
16 about 140-- I'm sorry, 120, there is a C.N. Telecommuni-
17 cations line which has been cleared and has been
18 abandoned. The posts are still there and it is of course
19 an area of existing disturbance. Now what I'm suggest-
20 ing to you is, bearing in mind that you have a disturbed
21 area which is abandoned, is there any virtue in planning
22 the pipeline along that route?

23 A Well, I think there is.
24 I've thought of that. I talked it over with the geo-
25 technical consultants and there's still some question
26 in my mind as to the problem of using existing cut-lines.
27 Now some people say that there is a problem with
28 degrading permafrost in these areas because some of
29 the -- I don't want to go into it right now, but if
30 you will accept that changing the vegetation along

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1 the C.N.T. line is going to affect the integrity of
2 the permafrost layer. Do you admit that?

3 Q Well, I'm not being
4 cross-examined. I'm not asking you to give any geo-
5 technical information. I'm asking this panel if from
6 an environmental or biological point of view that
7 route should not be considered.

8 A I think yes, I did
9 consider it. I asked the geotechnical people and they
10 said that there would be more problems with putting
11 the pipeline in there or along any cut line, but then
12 I've talked to them at other times and I've kind of
13 heard that maybe this isn't such a problem. But I
14 understand that it is a problem because of permafrost
15 degradation in an area, and it adds somewhat to lack
16 of predictability of what's going to happen to the
17 line in relation to permafrost degrading.

18 Q Well now, Mr. Bouckhout,
19 is that possibility one that is presently being
20 considered?

21 WITNESS BOUCKHOUT: You're
22 speaking of course of the possibility of routing the
23 line along the abandoned C.N.T. line?

24 Q Yes.

25 A I am personally not aware
26 of whether that is presently being considered by our
27 engineering department. Our consultants, our environ-
28 mental consultants represented here did not make that
29 specific recommendation to me, and of course they have
30 already broached the general subject as they've said,

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1 with the geotechnical consultants, and they have to
2 also to also take into account not only the potential
3 geotechnical problems from a geotechnical point of
4 view, but potential problems from an environmental point
5 of view which might arise from geotechnical problems.

6 Q Well, let's look at it
7 this way. This line is abandoned and runs all the
8 way down to the Willowlake River. Now there are
9 obviously, there may be as many problems or more with
10 that line as any other selected. But what I'm asking
11 is, from a biological point of view, is there virtue
12 in giving consideration to using a line that has
13 already been disturbed?

14 A From a biological point
15 of view without going any deeper into the matter of
16 the other implications, certainly there is virtue in
17 considering such a location.

18 Q All right, is there
19 anybody on the panel who disagrees with that?

20 WITNESS HAYDEN: I would just
21 to the extent
22 qualify it/that on the stream crossings it would have
23 to be judged again on a site specific -- in a site
24 specific manner. It could well be the C.N.T. line has
25 been an inappropriate place to cross a stream.

26 Q Yes, and then I've no
27 doubt that you would have to move some distance from
28 the line from place to place to make sure you got good
29 crossings, wouldn't you?

30 A I would assume so.

Q Yes, and Dr. Whitney, I

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1 would take it that you would agree that there's some
2 virtue from a mammal point of view in staying in an
3 area where the drainage is already disturbed.

4 WITNESS WHITNEY: I think there
5 might be some advantage. There would definitely be
6 an advantage but I think that there would be disadvan-
7 tages as well.

8 Q Biological disadvantages?

9 A I think so

10 Q What ones?

11 A One thing that I am
12 particularly concerned about is the amount of degradat -
13 ion along the C.N.T. line, especially at stream
14 crossings, and it seems to me to be -- that we really
15 have had some very poor examples of engineering along
16 that C.N.T. line, especially in the areas of river
17 crossings and shoo-flies running parallel to the river
18 keeping gradients and this type of thing, and I think,
19 to me this represents an area that may be very unstable
20 to cross this associated.

21 Q Is that a biological
22 consideration, or a geotechnical one?

23 A I see the two as being
24 fairly close-knit here because if you don't have
25 stability in the ground surface, or the geotechnical
26 type of problems, you're going to have disruption of
27 biological problems.

28 Q Well, is it better
29 in this kind of situation to have two impacts or one?

30 A I'm saying that the one

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1 impact might be serious enough that we would want to
2 stay away from it because of the possible problems
3 of instability, and then we would be adding to those
4 problems. I think that it should be investigated
5 and I cannot just say that this should be something that
6 we should follow. This is the advice that I was given
7 from the geotechnical people.

8 Q Well, would I express
9 the consensus of the panel if I said that because this
10 C.N.T. route is so long and duplicates and parallels
11 such a large part of the proposed pipeline route that
12 it is a matter that should be given serious consider-
13 ation? And if it's possible, make the appropriate
14 adjustments, would everybody agree with that?

15 WITNESS BOUCKHOUT: Yes, I
16 think that's fair, Mr. Scott. We certainly have con-
17 sidered utilizing any existing cleared spaces for
18 such things as the alignment, for access roads and
19 so on. This, of course, is one of the major purposes
20 of our new photography and our production of
21 orthophoto mosaics to really finally establish a loca-
22 tion of these existing clearings to identify any
23 clearings which have been done subsequent to the exist-
24 ing aerial photography, which was available to us prior
25 to our own flights. So there's certainly virtue in
26 looking at all the existing clearings, and maximizing
27 the use of those clearings wherever possible.

28 MR. LUTES: Mr. Scott, you
29 appreciate that the consensus you've just obtained
30 with respect to utilizing that line is from our panel

The first part of the paper discusses the importance of the study of the history of the English language. It is noted that the English language has a long and rich history, and that the study of its history is essential for a full understanding of the language. The paper then goes on to discuss the various factors that have influenced the development of the English language, including the influence of other languages, the influence of social and cultural changes, and the influence of technological advances. The paper concludes by noting that the study of the history of the English language is a continuing process, and that it is essential for scholars to keep abreast of the latest research in this field.

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1 on the living environment and not from our location
2 panel.

3 But I take it that
4 MR. SCOTT:/ the panel on
5 the living environment thinks that this is something
6 that ^{if it} hasn't been already, should be considered.

7 A Yes, it is in fact
8 being considered.

9 Q I see that. Is it some-
10 thing that is presently on the list for consideration
11 before the four environmentalists who are here?
12 Are you working on that now or not?

13 A I turn that over to the 4
14 environmentalists who are here.

15 WITNESS WHITNEY: I think that
16 you've brought up a very good point. I think that there
17 are problems in these recommendations and that perhaps
18 these recommendations should be more formalized in
19 every detail of recommendation\$ and subsequent recommen-
20 dations that follow having made recommendations should
21 perhaps be listed; and I think that as the science
22 and environmental impact progresses, this is one thing
23 that is definitely needed.

24 Q You see, the thing that
25 concerns me about this is that -- and we've heard
26 about it, how the process works before, routinely,
27 and this is true of Arctic Gas as well, I think; a
28 line is presented to environmentalists and they react
29 to it adversely or positively, and there's nothing
30 wrong with that. But here we have a parallel line that
it seems to me may not have been put before you as a

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1
2 possible consideration. What I want to know is, are
3 the environmentalists going to consider this, and if
4 they regard it as sound, see if they can persuade
5 the geotechnicians to buy it?

6 WITNESS BOUCKHOUT:

7 A Most certainly the
8 environmentalists are going to consider it, and if
9 you would regard me as an environmentalist, it has
10 been considered. I have in fact talked at length,
11 several times to our route location people regarding
12 the utilization of such existing cut lines and they
13 are certainly taking it under study and they are looking
14 at it for this purpose.

15 Q But Mr. Bouckhout, what
16 I'm getting at is, are we really -- or you at Foothills
17 getting the best mileage out of your consultants, if
18 they react to existing proposals rather than being en-
19 couraged to say, "Well, is there somewhere else like
20 the C.N.T. line that we can put this 100 miles of pipe?"

21 A Are you asking me that?

22 Q I'm asking you.

23 A Yes, I think we are. I
24 think our consultants have made many recommendations
25 along these lines, recommendations which I personally
26 have not necessarily agreed with but I have certainly
27 accepted the recommendations and taken them into
28 account.

29 Q Well, Dr. Finney, have you
30 been asked to, or have you made any recommendation
with respect to this C.N.T. alternative, if I can --

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WITNESS FINNEY: No.

Q No. Mr. Hayden, have you?

WITNESS HAYDEN: No, I haven't.

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1 Q Mr. Kondla, have
2 you?

3 WITNESS KONDLA: Not in that
4 particular case. I put forth the concept of using
5 existing areas as a method of protecting the native
6 vegetation as a general concept or a guideline and
7 I certainly haven't stood around to watch and see if
8 Foothills will follow that principle in all cases.

9 Q Mr. Hayden, may I
10 ask why you haven't considered this?

11 WITNESS HAYDEN: Well, I
12 think probably through. Well, I think I have to
13 accept some degree of negligence here that when
14 we were doing our field program in casual conversation
15 perhaps with some of the people, we did mention
16 this possibility, not in a formalized set of recommen-
17 dations that we would ask why not use a C.N.T.
18 area and the usual response to that was from the
19 geotechnical people that that area was not as good
20 a crossing site on the stream as the area proposed
21 on a particular alignment. So we first looked at
22 the proposed alignment and within the corridor of
23 the photomosaic more or less, and if we found what we
24 thought were problems within that area we would
25 move outside of the area.

26 Q So believe me, I dis-
27 count your negligence entirely, wouldn't it be
28 correct to say that what you have been asked to
29 do is to react to the proposed alignment primarily?

30 A Yes, I would say that that

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1 is probably right, but that still doesn't give me an
2 excuse to not look at other areas.

3 Q Well, isn't that true
4 of the other panelists as well when all is said and
5 done?

6 WITNESS WHITNEY: I would
7 like to make a point at this time, that the art or
8 the science of environmental impact is progressing
9 everyday. One thing that Foothills has tried to
10 do, and I support fully, is to get the biologists in
11 the field with geotechnical people. I think that
12 progress has been made along this line, but I
13 can certainly see ways for this progress to continue
14 and for environmental impact to improve. Now, I
15 wasn't included on the first, say, leg, where the
16 geotechnical people and the environmental people
17 were working together along the line in the
18 springtime. When I was involved with the program I
19 saw that there was a problem that these meetings
20 were not in fact as formalized as I would like them
21 to be. So one of the recommendations that I made
22 and I think that you could find this recommendation
23 in the notes of the meeting, was the communication
24 between biological and geotechnical people be
25 kept track of. They should keep track of these
26 recommendations on a day to day basis, more formally.

27 So, I think we see and
28 realize the need for this and I think that we have
29 reacted to it, and in the future field program I think
30 that my recommendation will be followed and we will

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1 keep better track of these recommendations.

2 Q Well now, one fourth
3 matter. You have no gravel sites that are shown
4 on any islands or bars in the Mackenzie River, I
5 think that is true, isn't it, Mr. Bouckhout?

6 WITNESS BOUCKHOUT: I hope
7 not. I hope that it is true.

8 Q I take it that there
9 is --- I have been told that sometimes when borrow
10 sites are exhausted earlier than expected one
11 goes to the river for one's gravel, I take it that
12 as far as Foothills' is concerned, those islands and
13 bars will be inviolate regardless what happens.

14 A That is what we have
15 said.

16 Q Yes, and Dr. Finney,
17 that is important, is it not, because many of those
18 islands are the copulating areas for birds that fly
19 to Banks Island and other places?

20 WITNESS FINNEY: Well, they
21 do other things beside copulate, but it is very
22 important to migrating birds, yes.

23 Q For that reason.
24 Isn't it true, and snow geese, for example, that if
25 they are unable to copulate in transit at a location
26 in transit to their nesting destination it may be
27 too late when they arrive at their nesting destination,
28 the season is too short?

29 A That is very true and
30 that is precisely the reason why we hold those

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1 islands sacrosanct.

2 MR. SCOTT: Thank you.

3 THE COMMISSIONER: That
4 is why you hold those islands sacrosanct, is that
5 what you said?

6 A Maybe that is the
7 wrong word.

8 THE COMMISSIONER: No, that
9 sounds all right.

10 MR. SCOTT: For a copulating
11 goose it may be exactly the required word.

12 A It is even more im-
13 portant to the eggs.

14 THE COMMISSIONER: Well,
15 this is becoming impossibly clever, this exchange --

16 MR. SCOTT: And this
17 determination that you will not use these areas
18 for supplementary borrow, I take it, Mr. Bouckhout,
19 extends to the proposition that you will do no
20 dredging in these areas?

21 WITNESS BOUCKHOUT: We
22 have said that we will not do any dredging in the
23 areas where that dredging would effect the gravel
24 bars and the island fringes and so on.

25 Q Well now, Mr. Blair
26 came to Fort Good Hope and indicated to the
27 people there that steps would be taken to make a
28 relocation around Good Hope at Milepost 280. I
29 suppose this isn't an environmental relocation
30 as such --

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1 A No, I haven't listed
2 it as such.

3 Q What can we tell the
4 people of Good Hope, where is the line going to
5 go as he indicated it would?

6 A I don't think that
7 we really have, at least I cannot present to
8 you right now the final alignment there in that
9 particular location. I know that our people have been
10 working on it. Our biologists have, in response to
11 that, have had a look at the area, we have talked
12 to the local people of Fort Good Hope and exactly
13 where the line now is I cannot present to you at
14 this stage, but I assure that it certainly will
15 be presented the minute that it is finalized.

16 I don't know if that has
17 not already been done.

18 Q Have you any way of
19 knowing at this stage even the tentative location
20 of the new line near Good Hope?

21 A I could check with our
22 people in Calgary and try and determine.

23 Q I would be grateful
24 if you would let me know in writing if necessary.

25 NOW, one other matter. In
26 question four of your evidence, Mr. Bouckhout, you
27 deal with a change that was made and it is shown
28 on sheet four of sixteen of the fish and birds
29 map.

30 Now, let me read to you

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1 what you say:

2 "At a joint environmental review
3 of route and facilities locations held in
4 February of 1975, Lombard's mammalogist
5 expressed concern over the location of
6 wharf and stockpile sites at the Thunder
7 River and Payne Creek mouths."

8 NOW, who was Lombard's mammalogist who expressed that
9 concern?

10 A At that time the
11 gentlemen was Mr. Elmer De Bock.

12 Q Yes. He indicated
13 that information suggested the presence of denning
14 areas at these locations. Is that what he said?

15 A That is what he
16 said.

17 Q And as a result of
18 his concern, and I have added as his concern, as a
19 result the Thunder River site was moved about
20 14 miles upstream. Is that what happened?

21 A That is what happened.

22 Q Yes, and that was done
23 as a result of an environmental concern?

24 A That is right.

25 Q Well, now, let me ask
26 you to turn to the map. Do you have the map in
27 front of you?

28 A Yes, I have the map
29 of the Thunder River.

30 Q Well, that reveals the

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1 old location of the wharf and stockpile site is not
2 of course shown, but it would be right at the angle
3 of the river about six inches from the right-hand
4 corner of the map.

5 A Which map are you
6 referring to, Mr. Scott?

7 Q I am looking at sheet
8 four of sixteen, "Fish and Birds"

9 A Okay, I have the
10 mouth of the Thunder River. Would you proceed --

11 Q And the mouth of the Thunder
12 River is right at the top of that bump, isn't it?

13 A Right.

14 Q And that is where the
15 wharf and stockpile site used to be?

16 A Right.

17 Q And there was some
18 evidence that there was some foxes around there.

19 A There ~~was~~ evidence
20 of denning activity in that area.

21 Q So you moved it
22 down, upstream, I guess, upstream to its location
23 as shown on the map by the circle in the square and
24 the triangle?

25 A Right.

26 Q Yes, and I take it
27 that the result of that was to move it to a place
28 that was more convenient to the compressor station?

29 A No, the result of
30 that was, well, it was obviously to move it somewhere

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1 along the line where it was still within range of the
2 alignment and therefore the reaction to that particular
3 recommendation was to look for an alternate source
4 or an alternate site, rather, and that was the
5 site that was selected.

6 Q But Mr. Bouckhout,
7 the wharf and the staging area are there to serve
8 the compressor station location which will be the
9 construction site?

10 A That is right.

11 Q And where possible
12 you will want to have them as close together as
13 you possibly can for obvious reasons?

14 A That is right.

15 Q Yes, and the way
16 they were they were a long distance apart?

17 A That is right.

18 Q And the result of
19 finding these foxes is that you are able to put
20 them about two miles apart?

21 A Yes, that was very
22 fortuitous.

23 Q I see. Are you, to
24 be candid, are you suggesting that that move was
25 dictated by some fox dens located at the mouth
26 of the Thunder River?

27 A You bet. That is
28 what instituted the move.

29 Q I see. Isn't that a
30 move that any logistics expert would have recommended

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1 in any event?

2 A They may at some
3 time. I am not too familiar with the actual
4 conditions of the sites, relatively the initial
5 site as versus the present site, but I can assure
6 you that that was the impetus for the move.

7 Q I suggest to you,
8 Mr. Bouckhout, that before that your compressor
9 station used to be further down toward the Thunder
10 River, you ran a computer station, or a computer
11 study as a result of changes elsewhere and found
12 that you had to move it down so that it would be
13 fifty miles apart and then you moved your staging
14 and wharf area, all quite sensible.

15 A I suggest to you, sir ,
16 that that is incorrect.

17 Q All right.

18 THE COMMISSIONER: Is that
19 down or up.

20 A The wharf site was
21 moved upstream.

22 THE COMMISSIONER: It was
23 moved up.

24 MR. SCOTT: Upstream, I am
25 sorry. I presume that the corollary doesn't follow
26 that if you had found some fox dens where the staging
27 area is now, you would move it back?

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1 MR. LUTES: Mr. Scott, he has
2 answered that question twice.

3 MR. SCOTT: All right.

4 Q Now the last change I
5 want to refer to is the last also on your list, Mr.
6 Bouckhout, 749 Milepost. Do you see that, the
7 Trout River?

8 WITNESS BOUCKHOUT: Yes.

9 Q Yes, now you've listed
10 this as an environmental consideration change and
11 you say you have re-located borrow sites out of the
12 active flood plains.

13 A Yes.

14 Q That's not yet approved.

15 A That's the recommendation.

16 Q Well now, you have
17 earlier said on a previous panel that as a matter of
18 principle you are not going to have any borrow
19 sites on active flood plains.

20 A Yes. The reason that
21 particular recommendation is designated as pending
22 and so forth is that we're not even sure that that
23 particular borrow site is in fact in the active flood
24 plain, we are waiting to have a look at our new ortho-
25 photo mosaics just to designate whether it really is
26 in fact or not. Therefore it may be a non-recommendation.

27 Q Well, don't you know
28 where the borrow pit is?

29 A When you're designating
30 borrow pits on photo mosaics you designate them with

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1 the existing aerial photography, of course, and aerial
2 photography is not necessarily directly true.

3 Therefore when you re-evaluate on more current photo-
4 graphy, which is more stringently controlled, you may
5 find that the site does not in fact lie exactly where
6 it's designated on the original photography.

7 Q I see. Well now, Dr.
8 Whitney, could I turn to question No. 7 of your
9 evidence? You say there, if you have it, and you're
10 dealing with the Pine Point-Yellowknife lateral and
11 you say that based on your aerial surveys and site
12 investigations,

13 "Our major concern is the potential impact on
14 woodland caribou, wood bison and aquatic furbearers."
15 Well now, what is the potential impact on aquatic
16 furbearers? By that I take it you mean muskrat and
17 beaver.

18 WITNESS WHITNEY: Yes. The
19 potential impact would be going through areas of
20 present or historical high density areas, and if the
21 line could be moved to avoid these; another impact
22 would be -- I would say that would be the major problem
23 that I see; and then the impact of the pipeline might
24 have something to do with changing drainage patterns.

25 Q Well, is that a risk if
26 the line goes through as presently located?

27 A Yes, I think it's a risk.

28 Q And I take it that the
29 consequence of that risk is that the habitat of the
30 muskrat or the beaver will be -- maybe either damaged

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1 or destroyed.

2 A Yes, that's why we're
3 concerned.

4 Q And is the consequence
5 of that re-location?

6 A I would say that that
7 would be one of them, yes.

8 Q What are the other
9 consequences of it, the other mitigative measures?

10 A Other mitigative measures
11 would be taking special precautions to bring in
12 -- and I'm speaking of geophysical or geotechnical
13 type problems -- but maybe perhaps advising geotechnical
14 people that a very select type of backfill should be
15 used in this case that is going to assure drainage.
16 I might emphasize one of these areas that I would ask
17 them and say, "Now look, we're really concerned about
18 this area. Is there's anything, even though it might
19 cost a little more, that we could do to assure drainage
20 in this particular area?"

21 Q Have you isolated those
22 areas with any particularity yet?

23 A I would say one of the
24 areas -- we really haven't looked at our data and I'd
25 like to be helpful and tell you just my impressions
26 now, without going through the flight transect data,
27 would be in the Redknife River area. That would be
28 one example. I don't pretend to have them all located.

29 Q Well now, I want to ask
30 you some questions about caribou. I take it as a result

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1 of the evidence the other day, and perhaps today,
2 and as a result of your own readings, you are aware
3 of the overwintering -- of the general overwintering
4 range of the Bluenose caribou.

5 A Yes, I am aware of that
6 through various sources.

7 Q Yes, and generally speak-
8 ing that overwintering range may run from north of
9 Travaillant Lake down to Good Hope.

10 A You're saying potentially?

11 Q Generally recordings
12 have been made of Bluenose caribou in that physical area
13 from north of Travaillant Lake down to Good Hope.

14 A I would have to be very
15 honest in this situation and tell you that I don't
16 know what the distribution and abundance of the Bluenose
17 caribou herd, I don't know what it is, to my satisfac-
18 tion, to make any recommendations of mitigative measures
19 at this time. I feel that the capability exists to
20 come by this information, to study it, and to come up
21 with the proper mitigative procedure.

22 Q Could I get you to agree
23 that at the present stage what that means is that
24 you don't have adequate data to assess the potential
25 impact with respect to the Bluenose herd?

26 A Absolutely not.

27 MR. MARSHALL: If I could
28 interject, Mr. Scott has raised a point that is of interest
29 to my client as well. I gather that Mr. Scott has
30 available to him the data pertaining to this herd,

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based on studies that have been done by the Canadian Wildlife Service and there may be a report or at least a draft report. I wonder if that might be made available?

MR. SCOTT: That's the matter that Mr. Marshall raised the other day, and my answer is the same as the other day. When we can get the government to release it, which we are optimistic we will be able to do, we will let them have it.

THE COMMISSIONER: Well, I think that since the impingement of the pipeline up the valley along the wintering grounds of the Bluenose herd now appears to be a matter of some importance, that that report should be made available to all parties and to the Inquiry. At any rate let us know by Friday if you can, Mr. Scott.

MR. SCOTT: The trouble with these is that these are quite often done by contract authors, and it doesn't always follow that they are the property of the government, and in each of these cases the problem involved is eliciting the consent of the principal author. Now that has been heretofore no problem, but locating him sometimes is. Dr. Geist, for example, to deal with the other report, is lecturing at Yale University this week and I don't know what coffee shop he's in at Yale, but we seem to be having some difficulty getting in touch with him. One of the principal authors of this draft report we are trying to get in touch with, and when we have his consent -- we can't do it without his consent -- he will

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1 provide it and we will circulate it.

2 M R. MARSHALL: That's an
3 intriguing concept that the report done under contract
4 to the Canadian Wildlife Service requires the consent
5 of the principal author before it can be released to
6 the Inquiry. The same with the report done for
7 Commission counsel by Dr. Geist, which on the -- well,
8 I'll leave it there. Mr. Scott will let us know.

9 MR. SCOTT: If I had this
10 report or if one of my advisors had this report, I
11 would take the liberty, even without the consent of the
12 author, of releasing it. Now I don't. I have to get it
13 from the author.

14 MR. MARSHALL: You have Dr.
15 Geist's report.

16 MR. SCOTT: Dr. Geist's report
17 is in a different category, as my friend knows well,
18 it's not a report at all, it's some notes for
19 cross-examination.

20 THE COMMISSIONER: Well, let's
21 not go over that ground again. I, like you, Mr.
22 Marshall, I'm intrigued by the notion of some proprietary
23 right in a report that they pay you to do -- I'm sure
24 Mr. Scott will get this for us within a day or two, as
25 soon as the appropriate coffee shop is located.

26 MR. MARSHALL: Well, sir, it
27 is a matter of importance, because I understand that
28 we're going to have more caribou witnesses on the
29 stand maybe early next week and we've got a bit of a
30 logistics problem. I've got to get copies of relevant

Bouckhout, Hayden, Finney
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Cross-Exam by Scott

1
2 caribou reports to my advisors, one of whom is Mr.
3 Roseneau in Alaska. So I've got a real problem here
4 and as soon as we can get this --

5 THE COMMISSIONER: Well, I'm sure
6 Mr. Scott will do his best to get it for us and
7 he's doing that now. He's just not doing it as
8 with as good a grace as you and I would like.

9 MR. SCOTT: Well, the author
10 of the report is DeBach, who I think was hired by
11 Foothills for some particular project, he was
12 referred to earlier in the evidence; perhaps he
13 wasn't hired. His whereabouts are unknown. What we
14 have, I understand, is some handwritten notes and
15 I am trying to get the release of those, but you
16 will understand that's not an easy matter in the
17 circumstances.

18 WITNESS WHITNEY: I believe I
19 I have his address.

20 MR. SCOTT: His address?

21 A Yes, and his phone number.

22 Q Where is he?

23 A British Columbia.

24 Q Where in British Columbia?

25 Well, you can give me that later.

26 A Right, it's on my desk in
27 Calgary.

28 Q Have you been talking to
29 him about the Bluenose herd?

30 A Sure.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 Q I think maybe Foothills
2 has better access to this report than I have. Well,
3 no doubt, Mr. Bouckhout--

4 THE COMMISSIONER: Well,
5 Foothills should use -- I shouldn't say, but they
6 might consider using the same techniques as Canadian
7 Arctic Resources where when they think of them seem to
8 result in the production of all necessary documents.
9 I don't know whether their methods are ones that we
10 all would endorse, so perhaps you'd better let your
11 conscience be your guide.

12 A I'm also aware that Mr.
13 Hawley of the Canadian Wildlife Service has conducted
14 extensive surveys in the area, and the reason that I
15 know about these is that Bob Brown, I think, assisted
16 him on some of these flights and I would also, as soon
17 as possible, ^{and} I know that these things take a long
18 time, encourage the people at the Canadian Wildlife
19 Service to make this material available as soon as
20 possible.
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Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 THE COMMISSIONER: I think
2 that we have some idea where Mr. Hawley can be
3 located.

4 MR. SCOTT: No, but let's
5 be clear about this. We have maintained that through
6 the courtesy of the Department of the Environment, a
7 library of all their published and unpublished reports,
8 there are two reports, I understand, there, one by
9 Mr. Hawley, I think on the Bluenose herd, made in
10 1966; one by Thomas made in 1967. Now, if anybody
11 wants to look at the Environment Department's
12 library of published and unpublished reports, as
13 I have said a dozen times they may come to the
14 Inquiry office and see them all.

15 Now, we have been told
16 that there is another report on the Bluenose herd.
17 We don't know that there is. We are trying to
18 find it, but it is being suggested that there is
19 some kind of secret report, and we have no knowledge
20 of that whatever. Now, we will pursue these authors
21 and see whether they have written or unwritten notes
22 that can be transcribed, or some draft report in
23 their possession and try to produce it, but I really
24 resent Mr. Marshall's suggestion that we are sitting
25 on some report, because we are not.

26 MR. MARSHALL: I am prepared
27 to accept that, Mr. Scott. You have my apologies.

28 MR. SCOTT: I can also tell
29 you that Mr. Hawley wants to write a report on the
30 Bluenose herd but he can't because he is sitting around

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Cross-Exam by Scott

1 here all day. When that is written, that will be
2 produced as well. We are in business.

3 Now, apart from the
4 Bluenose herd, and I think that I understand how
5 you -- the position that you are in there, you
6 also recognize the potential impact of this line
7 on the reindeer herd in the delta area?

8 A Yes, I realize the
9 potential.

10 Q And I take it that
11 you understand that a reindeer herd are not herded
12 around like a group of cattle, that only in a
13 very general sense can their direction be controlled.

14 A I am very aware of that,
15 sir.

16 Q So that for most
17 practical purposes of interaction the reindeer herd
18 will have to be regarded as a kind of caribou
19 herd?

20 A As a kind of caribou
21 herd --

22 Q No, but your observation
23 this morning, and I don't have it word for word,
24 was well if they are a herd and they can be herded,
25 we'll herd them here or there out of the way
26 of the pipeline. Now, the advice that I am given
27 is that if a reindeer herd want to go north you
28 can't make them go south. All you can do is
29 gradually deflect their course by herding techniques.
30 Do you understand the same thing?

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 A Oh, absolutely.

2 Q Yes, so you would agree
3 with me that there is potential interaction between
4 the reindeer herd and the proposed pipeline route?

5 A Oh, yes, that is exactly
6 what I said this morning, that I thought that that
7 was a very astute comment, I think was the word that
8 I used.

9 Q And that also as I
10 understand it, remains to be examined by Foothills?

11 A Yes.

12 Q Yes, and are you
13 familiar with the phenomena
14 familiar/under which or in which or during which
15 a larger herd coming in contact with a smaller
16 herd may absorb the smaller herd and create one
17 large herd?

18 A I think at this time,
19 I am not trying to tell you that I think that the
20 people who own the herd now are a bunch of cowboys and
21 I would like to, if that's what you were trying to
22 say, that I thought that --

23 Q No --

24 A -- but I think that
25 there is some -- that there is more flexibility
26 with a reindeer herd than there is with a wild
27 caribou herd and that is the only point that I tried
28 to make. I'd just like to make that clear, please.

29 Q The point that I am
30 asking you to consider, and I am asking you whether
it is worthy of consideration, is that a deflection

Bouckhout, Hayden, Finney
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Cross-Exam by Scott

1 of the Bluenose herd from its traditional wintering
2 ground to the north, which you discussed with
3 Mr. Bayly this morning, might lead to it absorbing
4 the reindeer herd which would then become a part of
5 the Bluenose herd.

6 A I would say that I
7 have made my views public on reindeer herding in
8 my article that is listed at the back of the paper.
9 I have made my ideas in this article in Science, and
10 in this letter in Science reindeer herding
11 was given as a rational rape of the north, and in
12 this article, "A Ground View of Alaska", I said that
13 if reindeer herding is an example of the rational
14 rape of the north, I think that it might lead to
15 the birth of a monster, and I furthermore think
16 and I expressed it before, that there are problems
17 here and I think that they are problems that are
18 going to be very difficult ones that are going
19 to take a lot of thought, and I definitely think
20 that it is a possibility.

21 THE COMMISSIONER: Well,
22 your article, or letter in Science, do you have that
23 here?

24 A No, I don't.

25 THE COMMISSIONER: Maybe
26 you could send that along to us through Mr. Lutes or
27 Mr. Hollingworth and it could be filed as an
28 exhibit. You have quoted from memory, I take it?
29 You wrote this article and you --

30 A Yes.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 MR. SCOTT: The point that
2 I am asking you to consider is not at the moment
3 whether reindeer herding is good or bad or indifferent,
4 the reindeer herd is there and is a facility and an
5 advantage to the people who live near it, do you
6 understand that? They feed off it.

7 A I would refer you to
8 perhaps the reference that I referred to in the
9 article written by Klein, and I used his reference
10 as an evaluation of reindeer herding to northern
11 people.

12 Q But the herd is a
13 source of food for the persons who run it and
14 supervise it.

15 A I once again would
16 say that I am very concerned about the problem of
17 merging and I haven't thought about it. I will
18 need more data to think about it and I thought that
19 I would say that I would bring up one of the problems
20 inherent here is that reindeer herding is a very
21 difficult thing, and I realize the difficulties and
22 I don't suggest to say that everything is going to
23 copacetic in this problem.

24 Q No, as long as you
25 understand the potential problem of merger --

26 A Absolutely --

27 Q -- that may be created
28 by deflection of either herd from their traditional
29 overwintering ground.
30

Kondla, Hayden, Bouckhout,
Finney, Whitney
Cross-Exam by Scott

1
2 A And I think this problem
3 is further enhanced by some of the problems that Klein
4 has brought up in the reference that I referred to in
5 the Science article.

6 WITNESS BOUCKHOUT: I think,
7 Mr. Scott, we can concede that the herd exists that
8 it is in fact herded to some degree and that the
9 animals are used by local peoples involved in the
10 project.

11 THE COMMISSIONER: I think we
12 all knew that anyway. What intrigues me and maybe I
13 missed something here is merger something to be avoided
14 because it would mean that there would be greater pres-
15 sure on the wintering/grounds of the Bluenose herd or does it
16 have something to do with the mixture of two species,
17 these reindeer having been brought from Alaska or
18 Siberia or some place? Is that what you are getting at
19 or -- Mr. Scott and you seem to be well acquainted with
20 the subject.

21 WITNESS WHITNEY: I think that
22 there -- that you have listed two concerns that I also
23 share, yes. Not specifically, but this type, these
24 types of problems.

25 Q Isn't there included in
26 that additional concern perhaps it has been dealt with
27 that the merger will, may, I emphasize "may", make the
28 reindeer herd a part of the Bluenose herd and therefore
29 lead it to follow the Bluenose herd's traditional
30 migratory route?

Kondla, Hayden, Bouckhout,
Finney, Whitney
Cross-Exam by Scott

1
2 A This has been one of
3 the problems with reindeer herding say for instance at
4 Barrow, Alaska.

5 Q So you will be concerned
6 when you get on to it or when you have the studies and
7 the work done, not only with the interaction between
8 the pipeline and the reindeer herd and the pipeline and
9 the Bluenose herd but the reactions that may result
10 between the Bluenose herd and the reindeer herd?

11 WITNESS BUCKHOUT: As a result
12 of the pipeline project.

13 Q As a result of the pipeline.

14 WITNESS WHITNEY: Yes.

15 Q All right. Now, there
16 is one other kind of caribou and that is Woodland
17 caribou and I take it that they are found really along
18 the length of the pipeline route from the north to the
19 Alberta border or from Travaillant Lake to the Alberta
20 border?

21 THE COMMISSIONER: From the
22 what?

23 Q From Travaillant Lake
24 to the Alberta border.

25 THE COMMISSIONER: Oh yes.

26 A Yes, I think perhaps
27 historically they were far more numerous in the area.
28 I can't think of the page number but I think it is
29 around 6,000 that McTaggart-Cowan refers to these
30 animals as at one time being much more plentiful in the

Kondla, Hayden, Bouckhout
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1 area.

2 Q And would I be correct in
3 very general terms that the difference between a barren
4 land caribou and a Woodland caribou, as far as it is
5 presently understood appears to be that the Woodland
6 caribou either does not migrate or migrates in very
7 short and small migrations.

8 A I would say that that is
9 one difference, yes.

10 Q Yes, and that therefore,
11 the Woodland caribou where it exists between Travaillant
12 Lake and the Alberta border, is a resource that is
13 available generally in all seasons to the communities
14 that live along the Mackenzie Valley?

15 A As I understand it, it
16 would be only a significant source in the Fort Good Hope
17 area and then farther south, say, maybe in the Red
18 Knife Hills area. Now, maybe experts in the room can
19 correct this idea but that is what I believe.

20 Q But the resource impor-
21 tance of the Woodland caribou is that while the people
22 of Good Hope for ~~exam~~ example, may be able to hunt the
23 Bluenose caribou only in the overwintering season when
24 they come near Good Hope. There is a prospect that they
25 can hunt the Woodland caribou in any season of the
26 year.

27 A That is correct.

28 Q Yes. And therefore, from
29 a resource point of view, any interactions between
30 the Woodland caribou and the pipeline caused by the

Kondla, Hayden, Bouckhout
Finney, Whitney
Cross-Exam by Scott

1 pipeline if you will, are important and significant.

2 A Absolutely.

3 Q And these required to be
4 studied before impacts can be measured?

5 A Yes. And we have recom-
6 mended that and we have already started it.

7 Q Yes.

8 THE COMMISSIONER: Why did you
9 say that the reindeer herding project represented the
10 rape of the north?

11 A There is a long, rational
12 rape.

13 Q Yes, rational rape.

14 A This terminology of
15 rational rape was one that was used by a particular
16 colleague of mine in Alaska. And he was giving
17 examples where he felt that, if we could just be careful
18 and be rational that it would be very possible to
19 explore and develop the north just as long as we were
20 rational.

21 The examples that he
22 gave were strip mining for gold in which he described
23 the areas as not being significantly different--the
24 stripped areas being significantly different from the
25 adjacent areas. He also mentions something about forest
26 fires and he also mentions something about reindeer
27 herding. I, at the time, felt that if these were the
28 best examples of rational rape of the north, that
29 perhaps the rational rape would result in the birth
30 of a monster.

Kondla, Hayden, Bouckhout,
Finney, Whitney
Cross-Exam by Scott

1 Q Now, I only have a few
2 more questions and I would like to just try and finish
3 them up if I could.

4 Is it correct that
5 the Yellowknife/Pinepoint lateral goes through a bison
6 sanctuary?

7 A That is correct.

8 Q Yes, has any consideration
9 as yet been given to the impact of this on the bison and
10 other wild life in that sanctuary area?

11 A Yes, it has.

12 Q And what is your con-
13 clusion about that?

14 A I don't have a conclusion
15 at this time.

16 Q Oh, I see. It is
17 premature to make a judgment as to what your view is
18 on that proposal?

19 A I would say that I have
20 views but these are strongly influenced by two
21 mammalogists Lombard North Group who have worked on
22 bison and I would be reacting to their advice.

23 Q Yes, what is your
24 tentative view then?

A tentative
My view is that the

There are other problems in the area that I am concerned about, and I have expressed concern about. That is the feeling of the mammalogists at Lombard North having consulted with other people who work on bison, that there could be a general trend of groundwater draining in the area exposing lake beds which appear to be overwintering areas for buffalo. So what I would like to do is I would like to have more information and we are going to be looking for this information on groundwater in the area, and I've heard that that's just recently available. So one concern is the future expansion of the herd, another concern is the changing of groundwater patterns, and we are interested in whether these change in groundwater patterns could have possibly been precipitated by a highway. Now this is just all very, very conjectural at this point, and perhaps I shouldn't even be speaking about it, but I'm trying to tell you I am concerned about it.

Q I take it that in the same

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 or adjacent areas there's also a woodland caribou
2 calving ground of some proportion .

3 A In adjacent areas?

4 Q Or near there, on the
5 Yellowknife-Pine Point lateral. On the Yellowknife
6 portion. I take it that if there is, that is
7 something you will have to consider as well.

8 A Just off the Horn
9 Plateau, is that --

10 Q I'm advised that it's
11 in the Bison Sanctuary as well.

12 A So the information that
13 we've been able to gather so far is that there is not
14 any crossing of the highway, and that information has
15 come from I think it's Jacobson.

16 Q Well now, Dr. Finney,
17 I've been advised that while whooping cranes normally
18 nest in the Hay River area, in the Fort Smith area,
19 that they have been sighted on portions of the
20 Yellowknife-Pine Point line. Do you know anything
21 about that?

22 WITNESS FINNEY: No.

23 I knew that there were, particularly non-breeding whoop-
24 ing cranes are rather elusive beasts, and that people
25 concerned with the whooping crane population spend
26 a great deal of time and effort trying to find out
27 where these non-breeding birds go. I hadn't been aware
28 of the -- that they occurred along the Yellowknife-
29 Pine Point lateral, or their frequency.

30 Q Well, I take it that

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 bearing in mind at last count there were only 65
2 in the world, that that is a matter that will have
3 to be thoroughly considered as you prepare the impact
4 statement on that line.

5 A I will certainly be
6 consulting with the people that know most about it and
7 I am fairly satisfied that in the surveys of the
8 area that we did this summer and will be upcoming in
9 future summers, that we probably will be able to find
10 something as large as a white whooping crane.

11 Q Well now, Mr. Bouckhout,
12 yesterday I asked Mr. Hemstock some questions about
13 the monitoring function that Arctic Gas intended to
14 perform both during construction and following con-
15 struction, and I distinguished between monitoring as
16 a policing aspect, monitoring to ensure compliance
17 with rules on the one hand and monitoring to assess
18 developing problems on the other, and I wonder if you
19 could read that evidence, which is in Volume 99, pages
20 15047 and -- to 15052, and like Mr. Hemstock, give me
21 in written form at a convenient time some detailed
22 account of the ambit and scope of that kind of
23 monitoring as far as Foothills is concerned. Is that
24 possible?

25 WITNESS BOUCKHOUT: If I have
26 you correctly, what you're asking for is you're asking
27 for our remarks regarding monitoring as a function of
28 historically documenting change?

29 Q No, I'm not really. One
of the troubles with the -- with some of the situations

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 we found ourselves in is that when a concern is raised
2 Arctic Gas, to whom I was referred yesterday, would
3 say, "Oh well, we'll monitor that," and we are getting
4 in bits and pieces the development of a monitoring
5 program, that will occur during and following con-
6 struction. I asked Mr. Hemstock, and I ask you
7 in those pages to provide us with the monitoring
8 program in full.

9 A That's an impossibility
10 at this stage. A monitoring program in full, it
11 simply is not developed in full at this stage. We
12 have reacted to a similar question on our approach
13 to monitoring in answer to a question referred to us
14 by the National Energy Board, which is of course
15 available to you.

16 Q Well, for example, are
17 you going to monitor caribou herds during and
18 after construction?

19 A Yes, I would think that
20 would be one of the areas which we will, and as I
21 say, we simply haven't set on an entire monitoring
22 program. We have worked along those lines, in fact
23 I have had commissioned and have completed a report
24 on remote sensing for various modes of monitoring, of
25 our application to a monitoring program.

26 Q So I take it that the
27 situation is this, that at the present time you can't
28 tell us what parts of the living environment will be
29 monitored during and after construction. Is that it?

30 A Exactly. No, I can't.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 Q All right. Well now, also
2 in Volume 99 at page 15043 Mr. Hemstock indicated that
3 he was in the course of preparing a critical --
4 preliminary critical path chart which would show the
5 way in which environmental concerns would be incorpora-
6 ted. Now I think you made the same sort of observation
7 this morning to Mr. Bayly, that that was one of the
8 things you were going to do.

9 A Yes, that's right.

10 Q Would it be possible for
11 you to present as a sample, if you will, if that's the
12 best that can be done, a proposal for that kind of
13 chart?

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Bouckhout, Hayden, Finney
Whitney, Kondla
~~Cross~~-Exam by Scott

1 A A proposal for the
2 functioning of such a chart, the set up of such a
3 chart, is this what you are saying?

4 Q What did -- how it is
5 going to work, what the inputs are going to be, when
6 the inputs are going to be received and how they
7 will work together on the chart.

8 A Yes, I could certainly
9 provide an indication as to what the use of such a
10 chart whould be, how it should be set up and how
11 it can be used, yes.

12 Q Now, I only have the
13 one question that I began at the beginning with.
14 I have one other. Dr. Finney, in deficiency letter
15 number 6C, you relied on a paper by Dr. Fyfe, Mr.
16 Fyfe, I am sorry , in which you asserted that he
17 had concluded that peregrine nests could be moved
18 by the development of platforms and that that was
19 one of the responses that you gave.

20 Now, Mr. Fyfe has indicated
21 a concern that through accident his paper has been
22 misread. He tells me that his paper relates only
23 to the possibility of moving eagles' nests and has
24 nothing to do with peregrine falcons, have I got that
25 right?

26 WITNESS FINNEY: You have
27 got that right, and the deficiency letter has been
28 amended and we have been talking to Dr. Fyfe and
29 explained how this error arose, and I think that he
30 is happy with it.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 Q Mr. Bayly also asked
2 me, Dr. Whitney, to remind you that you were to
3 think of some things about aircraft harassment, I
4 think, as a result of questions that he asked you
5 and before you got away he wanted to have your
6 views on that matter.

7 WITNESS WHITNEY: I think
8 the only thing that could be added to the list, of
9 one of the possible problems, would be an impact on
10 the quality of the population, and I think that many
11 of the things that are there, while they imply, they
12 don't come out and say that there could be selective
13 pressures brought about, and I mean by selective, I
14 mean by Darwinian selection, and there could be
15 possible -- these could possibly result in adverse
16 selective pressures, and that is one addition that
17 I would like to have.

18 Q Well, I don't know
19 whether that will satisfy Mr. Bayly, he is not here,
20 but I presume that it will.

21 Have you given any thought,
22 Dr. Whitney, to the effect of the Foothills' right-
23 of-way as additional habitat, as additional winter and
24 therefore critical habitat for moose and other mammals?

25 A Yes, we have.

26 Q And what are your
27 views on that? First of all, will it happen, and
28 secondly, is it a good or a bad thing?

29 A I tell you, I don't
30 know whether it is going to happen or not, and I

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 don't know whether it would be a good or a bad
2 thing, and I could just qualify that and say that
3 I think that there are reasons why the moose are
4 where they are, and one of these reasons, even
5 though I know that there are certain people that
6 don't agree, but one of the reasons are snow
7 conditions, and some of the work that has been done
8 on the utilization of cut lines has been done in, say,
9 maybe just one type of snow condition and I think
10 that one of the things that I am worried about and
11 the mammalogists are worried about at Lombard North,
12 is that in various conditions, or in various degrees
13 of snow conditions, that these cutlines could be
14 used differentially, and this is one thing that
15 we are planning to look at.

16 Q What do you mean
17 differentially?

18 A I mean that there
19 is a possibility that snow conditions in the cutline
20 could be better in some cases because the snow might
21 be not as deep on a cut line because the sun would
22 melt the snow and there might be more sublimation
23 of the snow. There is also the problem that if there
24 were repeated melts and significant melts that this
25 could result in crusting which would make cutlines
26 not quite as available, and I think that this would
27 be one of the things that I would term as healthy,
28 -- or reaction, or variability in reaction as
29 varying conditions in one of the things that we are
30 trying to determine, and until we have looked at some

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Cross-Exam by Scott

1 of these things in more detail I would be hesitant
2 to say exactly how these cutlines are going to be
3 used, but I assume that one of the reasons is that
4 that area is not used presently as an overwintering
5 area, or say, particular cutlines along the Mac-
6 kenzie Valley, would be because of snow conditions
7 there as well as in the hills.

8 Q Well, will you be
9 giving consideration, as a possible socio-economic
10 biological plus to the pipeline, to planning and planting
11 the cutline so that the edge effect is maximized?
12 Will you be considering that kind of advantage of the
13 project as you make your impact statement?

14 A We will definitely
15 be considering it.

16 Q And I take it that you
17 will come to some conclusions, hopefully, as to whether
18 that is desirable or undesirable and the impacts
19 of it?

20 A Absolutely, yes.

21 Q Now, as you view the
22 mammal populations of the river, are you going
23 to attempt to develop information as to the
24 population?

25 A In relation to the
26 Mackenzie, you mean the whole pipeline then?

27 Q Yes, sir.

28 A Are we going to
29 generate information by which we can measure populations?

30 Q Yes.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1

A Absolutely.

2

Q Are you going to develop

3

information from which you can make estimates as

4

to the sustainable yield?

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Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott.

1 A I find this very
2 frustrating because -- not because I don't feel I
3 know the answer, but I think that the problem of
4 sustained yield has been one that's been debated
5 for just so many years of wildlife management, and I
6 think that it is a topic of debate, and I don't know.
7 I want to stay away from that topic of whether sustained
8 yield is a good idea or whether it's a bad idea. Can
9 you appreciate my wanting to stay away from that area?
10 Is that all right with you, or is that a thing that
11 you're getting at?

12 Q What I am trying to get
13 you to agree with is that in the course of your popu-
14 lation studies you will be doing work, that is necessary
15 and useful as a preliminary to any kind of game
16 management plan.

17 A Absolutely. I hope that
18 the information that we gather will be used by somebody
19 and perhaps after these perhaps workshop meetings that
20 I suggested this morning, perhaps we would be involved,
21 I don't know, this is sort of a political thing that has
22 to be decided, I guess; but hopefully the information
23 that we will collect will be useful to management
24 programs.

25 Q Yes, and that you will
26 be going in developing your information, you will be
27 trying to go further than population counts to such
28 things as mortality figures and calving success rates,
29 in the case of caribou and so on.

30 A The thing that I would

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1
2 do or that I would hope to do is look at indices
3 of these particular factors. I think that actually
4 determine instantaneous death rates, birth rates, this
5 type of thing, might be a little bit more than what
6 was initially necessary, and this will all come back
7 hopefully into some of my ideas of what an environmental
8 impact statement should entail.

9 Q And this work, I take it,
10 is work that would have to be done in the course of
11 developing any game management plan by somebody.

12 A I assure you, sir, that
13 there have been many game management programs that
14 have not been based on that type of data.

15 Q Well, I understand that,
16 but a good game management plan has to have the kind
17 of input that you're developing for Foothills.

18 A I would say that a good
19 game management plan would have to have far more
20 detail than we have planned to do.

21 Q All right.

22 WITNESS BOUCKHOUT: Virtually
23 all biological information is of course used in the
24 development of a game management plan, and I think the
25 ultimate plan which results from such a development
26 is really determined by the amount of input, and
27 virtually anything including population estimates,
28 population dynamics, movement patterns, social behaviour,
29 etc. is all necessary biological input into a game
30 management plan, and obviously the more information

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1 you have at hand, the better plan you can develop.

2 Q Well now, Dr. Whitney,
3 to come to my first question, what do you regard as the
4 gaps or deficiencies or short-falls in substance or
5 technique in the Arctic Gas work as you know it?

6 WITNESS WHITNEY: Would you
7 just bear with me? I have a few --

8 WITNESS BOUCKHOUT: I wasn't here
9 throughout, Mr. Scott. Did you ask the same question
10 of Arctic Gas relative to Foothills?

11 MR. SCOTT: I don't think I
12 did.

13 WITNESS WHITNEY: I would say
14 one of the shortcomings that I have of the -- or gaps
15 that I have, that I'm concerned about in the Arctic
16 Gas studies -- well, first of all I'd like to say that
17 I think it should be pointed out that they have done
18 some, in my impression, they have done some very good
19 work and we plan to use some of this work and I think
20 that they have made some mistakes; but I think that
21 if anybody says that ^{any} their research doesn't have short-
22 comings, well then you ought to have some serious
23 doubts about that scientist.

24 So I --

25 Q We can take that as a
26 given for all members of the panel.

27 A O.K., I just really don't
28 know where to start on this.

29 THE COMMISSIONER: Well, excuse
30 me, Mr. Scott, is this something we should start on

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Whitney, Kondla
Cross-Exam by Scott

1 tonight? Not tonight but this afternoon?

2 MR. SCOTT: I'm going to ask
3 this question of each member of the panel, as I have
4 indicated, and then I'm finished. I would have no
5 objection of putting it off till the morning. I don't
6 know whether any member of the panel wants to go home
7 tonight.

8 THE COMMISSIONER: Well, we'll
9 leave that up to you, Mr. Lutes, and members of the
10 panel. If you have reservations on a plane that's
11 leaving in an hour or so, you can go ahead and give
12 us your views now; but if you were not going to leave
13 till the morning plane, I'd just as soon let you think
14 about this overnight and discuss it in the morning.

15 MR. LUTES: I don't think the
16 panel had any arrangements to go home tonight, although
17 we discussed the possibility but I think we'd all be
18 prepared to stay and go on the morning flight, if we
19 can finish in time for them to catch the morning flight.

20 THE COMMISSIONER: Yes. Well
21 this is Mr. Scott's last question, I think.

22 MR. SCOTT: The morning plane
23 leaves at 11, I think, so it's going to be pretty
24 difficult. Do we want to start and do one or two, and
25 then -- it may be that it can all be done in half an
26 hour in the morning but I'm not quite sure. Or do
27 you want to begin at --

28 THE COMMISSIONER: Sorry.

29 M R. MARSHALL: If we leave
30 these things till later it seems to get longer. If

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1 Mr. Scott is ready to go ahead, I'm prepared to take
4 notes now, sir.

2
3 MR. LUTES: If the Court
4 reporters can survive.

5 THE COMMISSIONER: Well, really
6 it's 20 after five and I think that these people will
7 be fresh in the morning and can give us their views
8 succinctly, and may I suggest we reconvene at 9:15
9 and that will surely accommodate the needs of everybody.
10 You can think about these things overnight and I see Dr.
11 Clark is in the audience now listening with great
12 interest to the shortcomings you are about to point out,
13 as soon as we reconvene in the morning.

14 9:15 then.

15 (PROCEEDINGS ADJOURNED TO DECEMBER 11, 1975)
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MACKENZIE VALLEY PIPELINE INQUIRY

Government
Publications

IN THE MATTER OF APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES, and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

AND

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

December 11, 1975.

PROCEEDINGS AT INQUIRY

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- 1 APPEARANCES:
- 2 Mr. Ian G. Scott, Q.C.,
- 3 Mr. Stephen T. Goudge,
- 4 Mr. Alick Ryder and Mr. Ian Roland for Mackenzie Valley Pipeline Inquiry;
- 5 Mr. Pierre Genest, Q.C.,
- 6 Mr. Jack Marshall, and Mr. Darryl Carter for Canadian Arctic Gas Pipeline Limited;
- 7 Mr. Reginald Gibbs, Q.C.,
- 8 Mr. Alan Hollingworth & Mr. John W. Lutes, for Foothills Pipe Lines Ltd.;
- 9 Mr. Russell Anthony & Pro. Alastair Lucas for Canadian Arctic Resources Committee;
- 10
- 11 Mr. Glen W. Bell and Mr. Gerry Sutton, for Northwest Territories Indian Brotherhood, and Metis Association of the Northwest Territories;
- 12
- 13
- 14 Mr. John Bayly or Miss Leslie Lane for Inuit Tapirisat of Canada, and The Committee for Original Peoples Entitlement;
- 15
- 16
- 17 Mr. Ron Veale and Mr. Allen Lueck for The Council for the Yukon Indians;
- 18
- 19 Mr. Carson H. Templeton, for Environment Protection Board;
- 20
- 21 Mr. David Reesor for Northwest Territories Association of Municipalities;
- 22
- 23 Mr. Murray Sigler for Northwest Territories Chamber of Commerce.

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. ANTHONY: Mr. Commissioner, I wonder if while Mr. Scott is preparing to commence or recommence his discussion, if I may take a moment to respond to Mr. Marshall's comments made in my absence the day before yesterday, according to Volume 99 of the transcript, and I would like to comment on the two points he made.

The first one with respect to the obtaining of reports from Canadian Arctic Resources Committee, first of all I want to make it clear that pursuant to your ruling a full set of all these reports have been from the time they were prepared and available, and from the time they were listed were available in the Northern Assessment Group Office in Ottawa for review by any of the participants for attendance and photocopying and taking them away, as they wished. They have been available there and have remained there for the various participants.

Now, Mr. Marshall requested that in addition copies be made available here in Yellowknife for his convenience, and I agreed to do that, and arrangements were made to have them sent here. Because of the postal strike and because they were being sent here at Mr. Marshall's request, and for his convenience, I asked that they be sent via internal courier service. Therefore a parcel of all the reports was put together and was sent to this Inquiry

1 to my attention and sent up to Yellowknife via his
2 courier service. Therefore, as Mr. Marshall has
3 indicated when he spoke to you the day before
4 yesterday, there has been a complete set with my name
5 on it sitting in his office for this last week, and
6 when it arrived that was the parcel he did not open.
7 I was not using his courier service; I was sending up
8 the documents that he requested and had he contacted me
9 and asked me whether these reports that he had
10 requested were being sent, I would have indicated that
11 they were sitting in his office with my name on it
12 for his convenience and at his request.

13 The second point is the
14 suggestion by Mr. Marshall that in any way, any of
15 these reports prepared by the Northern Assessment Group
16 were suppressed or in some other way not made available
17 to him. Again, this is another issue Mr. Marshall
18 did not discuss with me. Had he discussed it with me
19 I would have made two points with him. The first one
20 is, as I attempted to indicate when I tabled this
21 list, Mr. Commissioner, that I was presenting this
22 list not because in our view all these were reports
23 and studies that required filing pursuant to your
24 rules, but rather as -- in response to a request by
25 Mr. Waddell of this Inquiry, and in recognition of
26 this Inquiry's interest in the Northern Assessment Group
27 and its ability to facilitate the participation of
28 others, and we therefore filed all the documents,
29 whether they were reports and studies or whether they
30 were merely notes for cross-examination, or in fact if

they were correspondence to others.

Now if Mr. Marshall was to look at the list of reports that was submitted or submitted on the parts of that list, you will note they include things such as the compilation of Dogrib Loucheux, Slavey and Chipewyan names for various bird, fish, mammal species. This was a compilation to assist the various native participants in their discussions with the communities, and this was, I would suggest, would not go under the heading of

"Report or Study",

they are merely words drawn from dictionaries and other sources to assist various field workers. However, they were filed in order that this Inquiry could have an indication of the source of work that the Northern Assessment Group was involved in.

Similarly, Mr. Marshall made a point of referring to a document entitled:

"The Annotated List of Environmental Issues of Relevance to the Inquiry."

This was similarly prepared by the Northern Assessment Group but as it indicates on the cover, it was in fact sent to the Canadian Nature Federation, M.G. Progue, The Canadian Environmental Law Association, and all the various other environmental organizations that had appeared before this Inquiry indicating their desire to participate, and though they were unable to participate as officials and as formal participants. On the very first page of that document the following sentences appear:

1 "Since it is important that the environmental
2 groups actively participate in the Mackenzie
3 Valley Pipeline Inquiry, the Northern Assessment
4 Group has undertaken the preparation of the
5 following list of environmental issues that
6 they feel are of particular relevance to the
7 various environmental organizations. It is hoped
8 that the list will lead to the identification
9 of themes for the Inquiry by the various
10 organizations as soon as possible. When this
11 has been done, the Northern Assessment Group
12 can actively assist the environmental organiza-
13 tions in preparing their brief for the selection
14 and preparation of expert witnesses."

15 What follows is merely a list of issues identified
16 from the various reports that have been tabled before
17 this Inquiry, a list to the various organizations who
18 have expressed an interest in this Inquiry but who
19 cannot be here on a continuing basis to assist them
20 in preparing their briefs for this Inquiry.

21 Now, I do not feel I need
22 in detail
23 to go through/and review all these reports. I can refer
24 perhaps just to one other that Mr. Marshall referred
25 to, and that's the summary of information contained
26 in the CAGSL application. This is the one with the
27 release date of October. Now again, looking at that
28 you will see that all that has been done is the
29 Northern Assessment Group has selected from/ ^{the} number of
30 volumes of the Arctic Gas application and consolidated
the information according to area. This is again

1 provided for the assistance of the native organizations
2 and the field worker programs so that each community
3 would have an indication of where in the Arctic Gas
4 application issues of concern to them is found, and
5 that merely is a compilation and an areal putting
6 together of the information contained in the application.

1 Now, I do not propose
2 to go further through the whole list. I can go through
3 that with Mr. Marshall if he wishes, but I would
4 like to make it clear that this information was
5 provided for this Inquiry as an example of the type
6 of work that the Northern Assessment Group has done
7 and in recognition of this Inquiry's interest in the
8 work of the Northern Assessment Group as it assists
9 other environmental organizations, and not in any
10 way because they are lists of reports and so on
11 that are in the same nature as the various reports
12 that are to be tabled pursuant to your rules.

13 Now, there are some reports
14 that are in there that are obviously reports and
15 full reports that should have been listed. These
16 reports were all brought together, published over
17 the summer and they were listed as soon as they
18 were completed, and those are the reports that were
19 completed from the months of June, July, August and
20 by the time the proof reading and the printing
21 was completed it was September, and it was listed
22 in October.

23 Now, perhaps I need not, and
24 I am sorry to go at such length on this, but I thought
25 I should answer Mr. Marshall as fully as I could, and
26 I would like to assure both Mr. Marshall and the
27 other participants of our commitment to a fair and
28 full Inquiry and our desire to assist the various
29 counsel in the preparation of -- as they examine
30 the various material that we are presenting. The

1 Northern Assessment Group reports are here, they
2 have been here and they will be left at the Resources
3 Building in order that Mr. Marshall and the other
4 counsel can have access to them and review them at
5 their leisure.

6 Thank you.

7 MR. MARSHALL: I wonder if
8 Mr. Anthony could tell us when we could expect to
9 have the evidence of the panel that he proposes
10 to call next week on caribou?

11 MR. ANTHONY: As I indicated
12 to Mr. Marshall, the material is completed. We do
13 not have ample facilities here and as soon as the
14 photocopy is finished it will be available, and
15 my expectation is at noon today.

16 MR. MARSHALL: Mr. Anthony,
17 the ten reports that I didn't get from the list of
18 26, are those available so that I can have a photo-
19 copy?

20 MR. ANTHONY: I have checked
21 with our office. There is apparently some confusion
22 because they indicate that they double checked to
23 ensure that there was a complete set forwarded to you
24 as well as to me directly, but all the reports that
25 are on that list are available here and were in the
26 package to me and they are in the Resources Building
27 for Mr. Marshall's use.

28 MR. MARSHALL: Thank you.

29 MR. SCOTT: I am glad that
30 the panel were all here at 9:15 or they would have

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missed that interesting exchange by my friends.

NORBERT G. KONDLA,
WORTH HAYDEN,
GEORGE FINNEY,
PAUL H. WHITNEY,
LEO W. BOUCKHOUT, resumed:

CROSS-EXAMINATION BY MR. SCOTT (Continued):

Q Dr. Whitney, we were dealing last night with this round up question that I wanted to ask each of you and I would like to just repeat it for you to be sure that we have it on the record. It is this. Within your sphere of interest, what do you regard as the gaps, deficiencies or shortfalls in the Arctic Gas application and material as you understand them?

WITNESS WHITNEY: Well, I think that perhaps we should talk about deficiencies first and then gaps second. I see a slight distinction between the two. I think that deficiencies have to be taken into consideration in the same light that Dr. Finney talked about subjectivity. I think that there will always be deficiencies and I don't think, assuming that there will always be deficiencies that we can wait or think that we should wait on this project until all of these deficiencies are met. We have, at this time, as part of our continual process in listing deficiencies, told you in a brief manner what our plans for further research are and these projects are defined as reacting to gaps, and that this reaction to deficiencies, I think is a continual process and I would leave it there in saying that we have given you what we think are deficiencies by

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 telling you what we plan to do in our future field
2 research programs and we think that we will be finding
3 more deficiencies as our progress continues.

4 Q Well, that is a general
5 statement -- I am sorry, are you finished?

6 A No. Then, as far as
7 deficiencies, or gaps in environmental statements in
8 general, I would say that I would be mainly concerned
9 about a total lack -- I don't mean that, I will have
10 to rephrase that. I will just say a lack of vigour
11 that is experienced, say, in other or in the more,
12 perhaps academic field of science; and in more
13 academic areas the ways that deficiencies are defined
14 are fairly well outlined in the back of journals
15 or you can write to journals and you can ask for
16 the procedures that should be used in the editorial
17 process, but usually this involves, of submitting a
18 final report to an editorial body. These final
19 reports are reviewed, very often on an autonomous
20 basis by specific experts in specific fields. This
21 review goes back and forth between a very few
22 editorial people and the people who have written the
23 report. One reason for, I think, limiting this
24 exchange on a very -- between just a very few people,
25 the author and the editorial board, is to make sure
26 that the editorial comments are just between the
27 author and the editors, to make sure that the editorial
28 critics are appropriate, or perhaps the editors
29 have misunderstood what the author was trying to
30 say, perhaps due to some deficiency of the editor.

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 I think that this has been a process that has been set
2 up and adopted for many years. There are many more
3 reasons besides the one that I have given why this
4 has been adopted by the scientific community. I see no
5 reason why we should not follow that same rigorous
6 editorial process in the scientific concerns at this
7 hearing, as far as asking for deficiencies.

8 I can see some reason, say,
9 as we are reacting to things very rapidly and we cannot
10 be bothered perhaps by some of these academic concerns.
11 In this light I don't think that today is the right
12 time because many of these reports are still in progress
13 and they're not completed. I don't think that perhaps
14 it is the place, because I think that some of the
15 editorial comments will be shared with more people
16 besides the Editorial Board and the authors of these
17 reports, and I think that if we do have some serious
18 complaints that they should be discussed with these
19 authors or they are going to lead to misunderstanding
20 such as we experienced this morning, and I don't think
21 that perhaps the people on this panel, including
22 myself, are the best experts in all of these fields
23 to do some of these subjects justice. I would suggest
24 that this type of thing be forwarded to an Environment-
25 al Study Committee to be contracted to fill this role

26 I don't know whether the
27 other people on this panel agree or disagree with me,
28 and perhaps they would like to help you out; at this
29 time I would like to make a firm stand on this myself.

30 Q Well, Dr. Whitney, I

Bouckhout, Hayden, Finney
Whitney, Kondla
Cross-Exam by Scott

1 -- maybe I didn't make myself clear. You and the other
2 members of the panel yesterday said that you'd reviewed
3 the Arctic Gas application and the work that they had
4 done, as the first matter in which you were engaged,
5 and what I asked, understanding that it won't necessarily
6 be complete or final, really what I'm asking you is
7 having made that kind of assessment of their work are
8 you able to tell us where you think they may have left
9 areas out, where you think they may have given less
10 priority than you would to some subjects. Now when
11 confronted with that kind of question it seems to me
12 that there are a number of possible answers. First of
13 all, "I don't know because I haven't looked at it
14 thoroughly enough." The second is "I don't know because
15 I haven't done enough work on my own to make any
16 judgment of the Arctic Gas materials," and the third
17 is to give me your preliminary list as far as you have
18 it. I think everybody here understands the
19 stage of the work at which you now are, but is it
20 not possible to answer the question within the frame-
21 work I suggested?

22 A I think that within the
23 framework that you've suggested I have answered the
24 question, and I think that we have briefly given you
25 an idea of what we plan for future field work.

26 WITNESS BOUCKHOUT: I fully
27 agree with Dr. Whitney's answer, Mr. Scott. He's
28 indicated and all the panel members have indicated
29 what has been done with regards to field work, etc.
30 since Foothills began the operation. He has, and all

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1 the other panel members have explained what type of
2 work is planned in future, and we're obviously not
3 doing this work for nothing. We're doing this work
4 because these are where the deficiencies are. I
5 really don't understand what further you want.

6 Q Well, if that's the
7 panel's answer, of course, I can't pursue it. I would
8 have thought, however, that each member of the panel
9 in reviewing Arctic Gas' work would have determined
10 that, ^{if} there were things that they think are lacking or
11 things that they think they will give attention to,
12 that it doesn't appear Arctic Gas is going to give
13 attention to; but now I take it for Dr. Whitney either
14 he feels he's indicated that in his general evidence
15 or he's unable to indicate it. Let's come to Mr.
16 Hayden, what do you say, Mr. Hayden?

17 WITNESS HAYDEN: Well, Mr.
18 Scott, in principle I agree with what Dr. Whitney
19 has said. I find it obviously a difficult question to
20 answer. I can certainly go through and re-state
21 what we consider to be our deficiencies, which
22 obviously we consider to be deficiencies in general
23 in the assessment of a gas pipeline on the Mackenzie
24 Valley. So that would imply that I gather that
25 opinion from reviewing both CAGPL's Biological Series
26 and any other information, be it Federal Fisheries
27 type information or whatever.

28 Q All right, just list those
29 if you could in point form, if that is possible.

30 A These are the sort of

things I discussed yesterday:

No. 1, the first one that would come forward would be a better understanding of the winter ecology and movements and location of particularly the coregonid species along the alignment.

Secondly, the experimental, if you like, idea that I discussed yesterday about a winter siltation study of sorts. Now, it could well be that Aquatic Environments does not consider those to be of paramount importance, and they could probably make a very good case on it. I consider them important enough to pursue. Obviously there is another thing which would not affect CAGPL, is our data deficiency on the Yellowknife-Pine Point lateral but that is really of no concern of theirs, that's our problem.

Q Anything else?

A Those, I think, are the main points.

Q All right. Mr. Kondla?

WITNESS KONDLA: I'd like to phrase my answer in terms of general recommendations that should be given consideration by all the participants, rather than direct them exclusively at CAGSL. I'm certainly not implying any criticism of the work that CAGSL has done.

Q Oh no, I am not asking for criticism. I take it that the panel so far gives precedence to Arctic Gas and recognizes that their job so far as we've heard has no deficiencies, apart from

Bouckhout, Hayden, Finney
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1
2 deficiencies that are shared by the industry generally.
3 That certainly places Arctic Gas in a pre-eminent
4 position according to the evidence of this panel.
5 Carry on, Mr. Kondla.

6 MR. LUTES: Put your own
7 needle back in your sewing kit.

8 A I'd just like to raise
9 three issues that I think warrant further consideration
10 from a vegetational viewpoint.

11 One that particularly concerns
12 me is the possible implications of permanent roads
13 in fens and swamps. I don't propose to go into any
14 detail as to why I feel this is a concern. I just
15 indicate that this is a concern and I think everybody
16 should give more thought to that issue.

17 I also feel that more con-
18 sideration should be given to the question of rare
19 and uncommon vegetation types, something that I feel
20 has been glossed over in the past by everybody involved.

21 Finally, I think more thought
22 and consideration should be given to the greater use
23 of vegetation information in determining terrain
24 sensitivity and also in route selection, and specifi-
25 cally I'm thinking of the biophysical land classifica-
26 tion. Now I don't want to explain just exactly what
27 that is. I understand that Mr. Zoltai will be giving
28 evidence for CARC at this Inquiry, and since he does
29 know what this is all about I think that might be a
30 good time to bring this issue up further, but I

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1
2 personally think that a biophysical land classification
3 concept is potentially a very powerful tool for
4 impact assessment, and in planning the routing of
5 a facility such as a pipeline.
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Cross-Exam by Scott

Q Dr. Finney?

WITNESS FINNEY: I will address myself solely to information gaps as I see them, now, and some of them have already been mentioned previously in my direct and in my cross-examination. However, I haven't had a chance to bring up some others.

One area that I think has to be looked at in more detail is the area south of Norman Wells with respect to raptor nesting. This hasn't been done, I gather, by either the Wildlife Service or CAGPL because of the tremendous amount of money and energy required to get exact locations of raptor nests and I think that before the alignment goes through, that obviously has to be examined.

The second area of general concern is that of biological variability which has been discussed in great detail and I think that the continuing studies of biological parameters which show variability is necessary in order to have as firm a foundation as possible, so this means continuing surveys to some extent on spring migration on breeding areas, fall migration, etc. The Arctic biological systems often, at least in the bird work, change rather rapidly over a short period of time.

A third area of concern to me is that of the impact of barging on waterfowl, particular during spring and fall migration, and --

Q What?

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Whitney, Kondla
Cross-Exam by Scott

1 A Barging, barging
2 activities, and I have proposed to address myself to
3 this problem. Whether I can come up with a meaningful
4 solution is another matter entirely.

5 A fourth area of concern
6 to me is a better definition of native utilization.
7 In preliminary consultation with the Northwest Territories
8 Game Branch I feel that the data that we have is
9 very, very -- lacks specificity with respect to
10 exactly how many birds were killed and where they
11 were killed. The records, my understanding of the
12 records is that they have records for how many --
13 or an estimate of how many birds are killed on
14 Yellowknife permits, for example, but they don't know
15 where these birds are shot, and I propose to try
16 to find out in some way, presumably it's through
17 co-operation with native groups themselves where they
18 are hunting, what birds they are hunting and how
19 many they are killing each year.

20 Those are some of the things
21 that have occurred to me. However, I agree with
22 Dr. Whitney in a point that if -- directing myself
23 specifically to deficiencies in Arctic Gas. It might
24 be viewed with cynicism by the one or two cynics in
25 the audience.

26 Q All right. Mr. BOuckhout
27 do you have any comments, and I would ask you if you
28 are prepared to comment, to give consideration also
29 to the question of not only substantive matters,
30 which the other members have commented on, but matters

1 of procedure moving to environmental review.

2 WITNESS BOUCKHOUT: Well,
3 Mr. Scott, I would begin by reiterating the fact that
4 we developed our program relative to the information
5 base that was available at the time we initiated the
6 program. Therefore in development of the program,
7 and the direction of the methodologies, we were in fact
8 reacting to what we felt were deficiencies at that
9 stage.

10 When you asked for deficiencies
11 in a very general vein I think perhaps it would be
12 easier if you qualified that saying, are these
13 deficiencies with regards to where you should be at
14 this stage, or are these deficiencies with regard to
15 where you should be when the pipe is ready to go
16 into the ground, and they are two entirely different
17 matters.

18 Q I think, Mr. Bouckhout,
19 I was really trying to zero in on deficiencies of
20 neither type. Obviously Arctic Gas is not the
21 ultimate stage, they have made that clear, for either
22 final design or construction, and I think that what
23 I was trying to concern myself with, was deficiencies
24 as you envisage them in terms of direction or priority.

25 A Okay, I may comment a
26 bit further then with regards to what I feel are
27 very major areas of concern which we are presently
28 developing and I certainly cannot speak for Arctic
29 Gas since I am obviously not privy to their plans.
30 The areas of contingency program planning, information

1 education programs, inspection programs, refinement
2 protection measures and so on, on all areas we
3 have considered of great importance and are rapidly
4 working towards development of programs, at least
5 conceptual programs, for a base in these areas.

6 Beyond that, with regards to
7 the differences between Arctic Gas and Foothills in
8 terms of operation or approach there are some obvious
9 ones, one of which is that the consultants reporting
10 to Foothills, in other words, those consulting to
11 environmental affairs at Foothills, report directly
12 to me at Foothills, whereas, in the Arctic Gas situ-
13 ation there is an intermediary in that the Northern
14 Engineering Services has a number of the consultants
15 reporting to them.

16 Beyond that, the subject
17 areas of such things as waste disposal and water
18 sources fall directly within my sphere at Foothills.
19 I am not sure where these particular issues would
20 fall at Arctic Gas. This means, of course, that I
21 have immediate input and immediate control over
22 such areas, and I would say that beyond that that
23 is pretty much all I have to say at this moment. If
24 that is all along that line of questioning, I do
25 have one additional comment, however.

26 Q Could I just make
27 one observation. I take it that as you begin to
28 conceptualize in more precise form the kinds of programs
29 that you referred to in the first part of your answer,
30 that you will make summaries or preces of those

Bouckhout, Hayden, Finney
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programs available to your counsel so he can make
them available to the Inquiry as work proceeds?

A Yes, most definitely.
We have already agreed to that.

Q All right, was there
something else you wanted to say?

A Just one comment on
something that you brought up yesterday with
regards to the Taglu plant. We don't have total
familiarity of course with the plans for this parti-
cular plant and we would propose to review the
producer evidence in this regard when it is presented
in Inuvik. I would respond to your request to Dr.
Finney of yesterday that if we have anything further
to add, having reviewed the producer evidence at
Inuvik, I would think this would be probably the
best stage to confront this particular issue.

MR. SCOTT: Those are all
the questions that I have, gentlemen, and I want to
thank you very much for your assistance.

THE COMMISSIONER: Any
re-examination?

MR. LUTES: No, thank you.

THE COMMISSIONER: Well,
thank you, Mr. Bouckhout, and members of the panel
for sharing with us the benefit of your knowledge and
experience and you are excused and I hope that we didn't
keep you unduly by asking you to remain until today.
Thank you.

(WITNESSES ASIDE)

1 MR. ANTHONY: Mr. Commissioner,
2 I believe it is now time for the Canadian Arctic
3 Resources Committee to call its evidence on the combined
4 Phase 2 and 3, and while the panel is taking its place
5 and being sworn in, perhaps I could indicate the
6 nature and the timing of the evidence, as I understand
7 it, for the continuation of this phase. We have
8 before us this morning Dr. Peterson and Mr. Zoltai,
9 who will be presenting evidence today. After a
10 brief discussion with Commission counsel and other
11 counsel I have asked Dr. Novakowski to fly out from
12 Ottawa. He will be arriving this evening and will be
13 available to give evidence tomorrow on rare and
14 endangered species.

15 On Monday there will be
16 four panelists appearing on our behalf providing
17 evidence with respect to fish and the fisheries
18 resource, and following that two further panelists,
19 Dr. Lentham of Alaska and Dr. Calef on caribou. I
20 think that should cover the time between now and
21 the Christmas break, in any event, at which time we
22 are going to be reviewing again the very able cross-
23 examination of the participants and we may wish,
24 following the Christmas break, to perhaps provide one
25 further panelist on caribou but we will advise the
26 participants in plenty of time and we will ensure that
27 they are advised of this and their evidence made
28 available.

29 MR. SCOTT: Mr. Commissioner,
30 I wish to discharge my undertaking to the Government

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1 of Canada, which was to point out that the witness
2 Mr. Zoltai is an employee of the Government of Canada
3 and needless to say gives evidence personally and not
4 as spokesman for any government policy.

5
6 STEPHEN C. ZOLTAI,
7 EVERETT B. PETERSON, sworn:

8
9 Before you this morning
10 is Dr. Everett Peterson, the gentleman in the blue
11 suit, and Mr. Zoltai, and I will introduce them to
12 you. First, Dr. Peterson, and before I do I would
13 like to make it clear that he is appearing here in
14 actually two capacities/ ^{at our} request. First of all to
15 provide the environmental evidence of the Socio-Economic
16 Committee, an indication of their studies and reports
17 being done and the recommendations they wish to present
18 to this Inquiry. Secondly, as a member of the Inter-
19 national Biological Program, and he will be providing
20 evidence on behalf of that organization indicating the
21 studies and the recommendations made by that organiza-
22 tion with respect to ecological sites.

23 So we have asked him to appear
24 and provide evidence in these two capacities.

25 MR. SCOTT: Mr. Commissioner,
26 first of all it may have been an oversight. I understood,
27 and this may cause some difficulty, Mr. Anthony to say
28 that Mr. Peterson was appearing to give evidence on
29 behalf of the Environmental and Social Committee, and
30 I don't think that was intended. I think Mr. Peterson

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1 will give evidence about the Environmental and
2 Social Committee and its work; but I don't understand
3 from Anthony or indeed from him that he purports to
4 speak on behalf of that Committee.

5 MR. ANTHONY: That is correct,
6 Mr. Commissioner, I'm sorry, it's a slip of the tongue.

7 MR. SCOTT: Well, these trans-
8 cripts are widely read in other places and I wouldn't
9 want there to be a misunderstanding.

10 MR. ANTHONY: Well, having
11 statement
12 made that perfectly clear, perhaps I could intro-
13 duce the panelists to you, Mr. Commissioner.

14 DIRECT EXAMINATION BY MR. ANTHONY:

15 Q Dr. Peterson, your
16 biographical sketch indicating your experience and
17 education has been circulated with your statement of
18 evidence found on page 38 of that statement of
19 evidence, and I wonder if you would summarize that for
20 this Inquiry?

21 WITNESS PETERSON: Thank you,
22 Mr. Anthony. By way of summary of my background
23 experience, I am trained as a forester at the University
24 of British Columbia, graduating in 1958. My graduate
25 training was at Yale University in forest ecology,
26 graduating in 1959 with a Master's degree. I then
27 returned to the University of British Columbia, Depart-
28 ment of Botany, where I obtained a doctorate in plant
29 ecology in 1964, having specialized in land-vegetation
30 relationships. Then several years later I had the

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1 opportunity to begin studies in law at the University
2 of British Columbia where I completed one year of
3 study in 1970-71.

4 I am a member of various
5 professional organizations including the Association
6 of British Columbia Professional Foresters, where I'm
7 a registered professional forester; I am a member of
8 the International Association for Ecology, the Canadian
9 Botanical Association, Society of Sigma Xi, Arctic
10 Institute of North America, Saskatchewan Natural History
11 Society, Arctic International Wildlife Range Society
12 in Canada, and Canadian Society of Environmental
13 Biologists, and lastly, the Alberta Society of Profes-
14 sional Biologists.

15 As for background work
16 experience, I have worked in most of the provinces of
17 Canada in the 1950's with the former Federal Department
18 of Northern Affairs & National Resources in Manitoba
19 and Ontario, with the Forest Service in British
20 Columbia, and with Northwestern Pulp & Power Limited
21 in Alberta. I was a research officer with the Canadian
22 Department of Forestry in the Maritime Provinces from
23 '62 to '64. I spent one year at the University of
24 Colorado, where I was half-time assistant professor
25 in the Department of Biology teaching plant geography
26 and half-time research associate in the Institute of
27 Arctic and Alpine Research. I then returned for two
28 years of teaching at the University of Saskatchewan,
29 then from 1967 to 1970 I was head of the Tree Biology
30 Section for the Alberta-Northwest Territories-Yukon

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Region of the Canadian Forestry Service in Calgary.
1970-71 I was biological advisor, part-time, and
law student part-time in the Faculty of Law, University
of British Columbia. My biological advisor duties
there involved helping a legal research team develop
model legislation for ecological reserves management
in Canada.

That study program was interrupted by an invitation to serve as project manager
for the Northern Pipeline Study within Environment
Canada and I took that position in 1971 and left it
in January, 1974; and it's largely on the basis of that
experience that I will be presenting the first part of
my testimony.

I am presently president of
Western Ecological Services Limited where I'm involved
as a consultant with various environmental programs,
some reports of which I have attached to the summary
of biographic evidence.

I am also a member of the
Public Advisory Committee/ on the Environmental Sciences
within the Alberta Environment Conservation Authority,
and a part-time visiting associate professor , University
of Calgary, Faculty of Environmental Design.

Q Dr. Peterson, you are
the author or co-author of the various reports and
studies that have been listed under the heading,

"Publications"
in your biographical note.

A Yes , I am.

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1 MR. ANTHONY: Mr. Commissioner,
2 the biography, the list of reports referred to, relied
3 on and the statement of evidence of Dr. Peterson have
4 been filed as an exhibit with the Inquiry.

5 (BIOGRAPHY, LIST OF REPORTS & EVIDENCE OF DR.
6 PETERSON MARKED EXHIBIT 357)

7 MR. ANTHONY: Q Mr. Zoltai,
8 I wonder if I may refer to your statement of evidence
9 and biography, and I wonder if you would summarize
10 your experience and qualifications as listed in the
11 biographical information on page 15 of the evidence
12 forwarded?

13 WITNESS ZOLTAI: I obtained
14 my Bachelor of Science of Forestry degree from the
15 University of Toronto in 1957. Immediately after
16 graduation I became employed by the Ontario Department
17 of Lands & Forests, the Forest Research Branch, as a
18 research scientist. My work included studies of
19 soil, climate, vegetation relationships mainly in north and
20 Northwestern Ontario. Some of the work projects
21 were related to land forms and surficial geology.
22 Other projects were with the mapping of productivity
23 of lands for forestry.

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1 In 1965 I joined the
2 Government of Canada, the Department of the Environ-
3 ment, then called the Department of Forestry, as
4 a research scientist. In this department and the
5 following departments of the Canadian Forestry
6 Service I worked on the study and development of
7 biophysical land classification, then supervision of
8 the Canada land inventory, the forestry end of it
9 in Manitoba and Saskatchewan; the study of land -
10 vegetation relationships in subarctic and arctic
11 regions. Later on I contributed to the pipeline
12 application assessment process by consultation;
13 acted as the chairman of the regional DOE review of the
14 Canadian Gas Arctic Pipeline application.
15 This task force report has been provided to the
16 Inquiry and tabled by the Commission Counsel. I then
17 in late 1975, I became the DOE co-ordinator of the
18 Environment-Social Program studies in the Mackenzie
19 Valley.

20 Q Mr. Zoltai, you are
21 the author, or co-author of the some 55 publications
22 that have been listed and circulated with your
23 biographical note, are you?

24 A Yes, I am.

25 Q Similarly, Mr. Zoltai's
26 biography and list of reports referred to and statement
27 of evidence is filed as an exhibit.

28 (BIOGRAPHY, LIST OF REPORTS AND EVIDENCE OF MR. S.
29 ZOLTAI MARKED EXHIBIT 358)
30

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1 MR. ANTHONY: If we could
2 go back to you, Dr. Peterson. Would you describe your
3 work with the pipeline studies in the Mackenzie
4 Valley and Northern Yukon, please?

5 WITNESS PETERSON: From the
6 1st of August 1971 until the middle of January 1974
7 I was fulltime term employee and acted as project
8 manager for Environment Canada for that department's
9 pipeline related studies in the Mackenzie Valley
10 and Northern Yukon, and the duties of that position
11 required me to develop pipeline related research
12 proposals and budget estimates in co-operation
13 with eleven agencies within the Federal Department
14 of Environment.

15 Now, in my prepared testimony
16 I have listed those agencies and I do not think that
17 it is necessary to list them here now. I think more
18 important in answering your question is to say that
19 I co-ordinated the pipeline research of these agencies
20 by chairing a Mackenzie Valley working group that was
21 made up of a project leader from each of those
22 eleven agencies within Environment Canada. I should
23 add that that working group also contained project
24 leaders from two other agencies that did not receive
25 pipeline related funds from within Environment
26 Canada, but instead received special funding directly
27 from the Department of Indian and Northern Affairs,
28 and those two other agencies were the Lands Directorate
29 of Environment Canada, with responsibility for pre-
30 paring the Land Use Information Map Series, prepared

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on behalf of the Department of Indian and Northern Affairs, and secondly, the Environmental Protection Service in Edmonton which had responsibility for preparing waste disposal guidelines on behalf of the Department of Indian and Northern Affairs.

So those were my responsibilities within the Department. Outside of the department, I represented Environment Canada as their co-ordinator within the Environmental-Social Program, and the structure of the Environmental-Social Program, as part of the task force on northern oil development has been tabled, has been shown as an appendix, as part of my prepared testimony, and I don't propose to try to describe it verbally to you.

During the last seven months of my assignment, my responsibilities within Environment Canada were greatly reduced. It was no longer a fulltime job and I devoted more time to direct work with the Environmental - Social Program. By the middle of 1973 the preparation of study proposals and budget estimates for the last year of studies under the Environmental-Social Program had been completed, and that, in effect, brought an end to the main assignment that I had within Environment Canada. So in the last half of 1973 I served as editor of the environmental portions of a report that summarized the main findings and the recommendations of the Environmental-Social Program up to that point in time, and that report which synthesizes many of the research findings of scientists within the entire Environmental-Social

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Program has been published as that program's report number 74-17.

MR. ANTHONY: Mr. Commissioner, that report is tabled with this Inquiry, or I will be tabling it as we go through. There is only the one copy which I am leaving with the participants and they will all be left with Ms. Hutchinson when the panel steps down.

A And finally, I should also add that co-ordinators with responsibilities similar to my own were employed within the Department of Indian and Northern Affairs, the Department of Energy, Mines and Resources, and in each of the N.W.T. and Yukon Territorial Governments, and I should also stress that the co-ordination role that I am talking, that I am describing, did not allow me to conduct specific field investigations of my own. However, through various field visits along the Mackenzie Valley and Northern Yukon, I did have a chance to observe virtually all of the proposed pipeline routes in Canada, except for the recently -- the revised routes over the Ebbutt Hills and any proposed routes east of the Franklin Mountains. But throughout all of my involvement with the pipeline studies, I have acted as a generalist. I have helped define issues and problems that required study and I have helped to synthesize the detailed findings of various specialists.

Q Dr. Peterson, could you describe in more detail the terms of reference of the

1 Environmental-Social Program?

2 A The Environmental
3 -Social Program was the administrative and functional
4 unit responsible for budget allocation and research
5 planning within or on behalf of the Environmental -
6 Social Committee, and I want to take a minute to
7 make the distinction between the Environmental-
8 Social Committee and the Environmental - Social
9 Program.

10 The Environmental-Social
11 an
12 Committee was a committee made up of/assistant deputy
13 ministers from each of the three main participating
14 departments, and that committee was chaired by Mr.
15 A.D. Hunt of Indian and Northern Affairs; and its
16 other two members were Mr. Gordon McNabb of the
17 Department of Energy, Mines and Resources; and Mr.
18 A.T. Davidson of Environment Canada; and in late
19 1973, Dr. J.S. Tener replaced Mr. Davidson as that
20 department's member on the Environmental-Social
21 Committee. The Director of the Environmental-Social
22 program reported to the Environmental-Social Committee.
23 Now, in the attached appendix of my testimony, the
24 positions held, the positions identified within the
25 Environmental-Social Program were held by persons that
26 I have shown in that appendix, and again, I will not
27 list them now.

28 Terms of reference were
29 never specifically written for the Environmental-
30 Social Program, but they were written and provided for
the Environmental-Social Committee and those terms

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1 of reference served as a guide for all who worked within
2 the Environmental-Social Program. The terms of
3 reference originally proposed for the Environmental-
4 Social Committee are attached as Appendix C to my
5 testimony and I will be referring to some of those
6 a little bit later. These terms of reference were
7 also summarized in a 1972 report of the Task Force
8 on Northern Oil Development under the title,
9 Pipeline North: The Challenge of Arctic Oil and Gas.

10 MR. ANTHONY: That report
11 also will be tabled with the Inquiry, Mr. Commissioner.
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1 In that report it was stated
2 that the Environmental Social Committee had the
3 responsibility of making recommendations to ensure
4 that any pipeline construction and operation would
5 cause minimum disturbance to land and that northern
6 residents would receive maximum benefit from such
7 activity. However, as the studies progressed and
8 certainly once there was the decision to hold this
9 Inquiry, the terms of reference of the Environmental-
10 Social Committee gradually changed from those originally
11 stated, and in the 1974 summary report that has been
12 tabled a few minutes ago under the title:

13 "Mackenzie Valley-Northern Yukon Pipelines,"
14 the terms of reference of the Environmental-Social
15 Committee were stated more generally as one of co-
16 ordination and data-gathering.

17 Now Mr. Commissioner, if I
18 could refer to page 22, Appendix "C" of my prepared
19 testimony, I would like to read the terms of references
20 -- the first four terms of reference of the Environmen-
21 tal Social Committee. The proposed terms of reference
22 for that Committee, reading only the first four of
23 eight were as follows:

24 "1. To act as a point of contact
25 for the Task Force on Northern Oil Development
26 between the Federal Government and industry on
27 environmental-social matters pertaining to northern
28 pipelines and related activities.

29 2. To identify environmental
30 and social problems and questions involved in the

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1 proposed northern pipeline construction and
2 operation.

3 3. To recommend and co-ordinate
4 the agency inputs, research and studies required
5 to propose solutions to these problems.

6 4. To recommend environmental
7 and social guidelines to the Task Force, which at
8 their discretion may be passed to industry to
9 guide them with respect to planning, construction,
10 maintenance and operation of northern pipelines."

11 Now of these four guidelines
12 that I have read into the record, numbers 1, 2, and 3
13 remained as important work objectives throughout the
14 entire work of the environment-social program.

15 The fourth term of reference
16 in my opinion was met by the preparation and publication
17 of the 1972 expanded guidelines for northern pipelines.

18 Now the other terms of reference
19 deserve brief comment. Items 5, 6 and 7 of these
20 original terms of reference dealt with identification
21 and recommendation of acceptable pipeline routes,
22 draft terms and conditions for grant of a right-of-way,
23 and recommendations in relation to native interests.

24 Now these matters became the
25 central focus of this Inquiry itself, and were not the
26 subject of specific publications under the environmental
27 and social -- or by the Environmental-Social Committee.
28 The last term of reference dealt with the assessment
29 of a specific pipeline application, and that was per-
30 formed by the Pipeline Application Assessment Group

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1 within the environmental social program.

2 Q Would you describe the
3 scope of studies carried out under the environmental-
4 social program?

5 A The scope of the entire
6 program is defined by the projects and the study objec-
7 tives of the various investigations -- of all of the
8 investigations carried out under the program. These
9 research objectives are too numerous to list in detail
10 and they have been recorded in quite concise form in
11 Figure B-2 on pages 23 to 31 of Report 74-17 that
12 was tabled a few minutes ago.

13 I think instead of going into
14 the detail of studies I should just point out a few of
15 the general features of the program.

16 One thing to note first is that
17 all of the studies under the environmental social program
18 were planned and carried out before there was a
19 specific application for a gas pipeline filed with the
20 government. This means that the studies by government
21 are not an environmental impact assessment of any one
22 specifically proposed project. The research and report
23 of the Pipeline Application Assessment Group in contrast
24 to that did raise specific questions about an actual
25 application. But the research conducted by government
26 scientists and by consultants on contract to government
27 did not direct itself to specific questions related to
28 any one application. I want to stress that that is
29 not necessarily a weakness of those studies, in fact I
30 think it can be argued that because the studies and the

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1 recommendations that are contained in these reports
2 are not directed to the details of any one specific
3 route, that they in fact often contain principles
4 that are of general application to certain parts of the
5 environment, regardless of any specific project that
6 may be proposed for the area. This means that a
7 recommendation, for example a recommendation that
8 particular kinds of construction techniques be avoided
9 in perennially frozen ground would apply regardless of
10 the geographical occurrence of that class of terrain,
11 and regardless of the project bringing about the con-
12 struction techniques. In summary what this means to me
13 is that many of the recommendations contained in the
14 reports of the environmental social program are of
15 general applicability and it can be argued that such
16 recommendations are more important than are site specific
17 recommendations. I feel very strongly that this Inquiry
18 and also others who will be involved with review of
19 final design of the proposed pipeline, should a right-
20 of-way be granted, have much to gain by noting the
21 sections of the environmental social program reports
22 that contain recommendations; and I should also point
23 out that a standard table of contents was used for
24 most reports of the environmental social program so
25 that the section containing recommendations is readily
26 identifiable near the end of each report.

27 Another general feature of these
28 studies is that they were limited in one important way
29 because they were not designed to investigate any of
30 the related industrial developments that would accompany

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1 construction of an oil or gas pipeline. Throughout
2 the studies the research was quite rigidly limited to
3 that which would provide information necessary for the
4 assessment of pipeline applications, and it was realized
5 that knowledge gained from these pipeline-related stud-
6 ies would be useful in planning and assessing highways
7 and other development projects, but there was not
8 specific environmental social program research initiated
9 to predict the environmental or the social effects of
10 increased petroleum exploration, petroleum production,
11 or processing plants, all of which would be integral
12 parts of any eventual pipeline project.

13 Therefore insofar as this
14 Inquiry is looking into environmental and social ques-
15 tions of related developments, such as exploration,
16 production, and processing, there are few, if any,
17 recommendations in the environmental-social program
18 reports that relate specifically to these aspects of
19 petroleum development.

20 One of the -- to return briefly
21 to the original terms of reference of the environmental
22 social program, one of the original terms of reference
23 indicated that the Environmental Social Committee
24 was to identify and recommend acceptable routes based
25 on environmental and social considerations. By early
26 1972 it was realized that this task was beyond the
27 scope of the environmental social program, except for
28 the general statement of acceptable corridors that was
29 outlined in the 1972 pipeline guidelines. So that
30 instead of defining specific preferred routes, the

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1 1972 guidelines contained a very important provision
2 in the form of guideline No. 4 on page 11, which read
3 as follows:

4 "In relation to the pipeline corridors identified
5 in (1) above, the government will identify geo-
6 graphic areas of specific environmental and social
7 concerns or sensitivity, areas in which it will
8 impose specific restrictions concerning route or
9 pipeline activities, and possibly areas excluded
10 from pipeline construction. These concerns and
11 restrictions will pertain to fishing, hunting
12 and trapping areas, potential recreation areas,
13 ecologically sensitive areas, hazardous terrain
14 conditions, construction material sources, and
15 other similar matters. A statement announcing
16 the above will be released ^{through} the office of the
17 Director, Environmental Social Program, Northern
18 Pipelines."
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1 That is the end of the
2 quote from page 11 of the 1972 guidelines, and as
3 I will explain later in a later question, no areas
4 have been officially defined under the terms of
5 this guideline.

6 So, in general, the scope
7 of the studies under the program were as broad as
8 considered necessary by members of the Environmental
9 Social Program to gather information necessary for
10 assessment of the pipeline application, and I feel
11 that only this Inquiry and events that follow it will
12 answer whether the studies were sufficiently broad
13 or in other cases, sufficiently detailed to assist
14 in predicting the environmental and social side effects
15 of the proposed pipeline projects.

16 A How were the study
17 areas determined geographically?

18 Q Well, I said earlier
19 that the studies were not directed to a specific
20 pipeline application, but their geographic coverage
21 was influenced by the generally proposed route maps
22 presented by the pipeline study consortia in 1971, and
23 also by general changes in routing plans that were
24 determined by occasional meetings between members of
25 the Environmental Social Program and representatives
26 of the pipeline study consortia. As an example, none
27 of the pipeline consortia were proposing routes through
28 the southern Yukon, and since it did not appear to be
29 government policy to promote route planning through
30 the southern Yukon, no specific studies of the

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1 Environmental-Social Program were directed to those
2 areas.

3 In 1971, when potential
4 pipeline routes were shown on generalized maps for
5 the west side of the Mackenzie Valley, then some
6 of the government studies were also directed to that
7 side of the valley. When the study consortia
8 later indicated that they placed a low priority on a
9 route alternative from Fort McPherson southeastwards
10 towards Sans Sault Rapids and a higher priority on a
11 route that stayed on the east side of the river, there
12 was a corresponding switch in priorities for field
13 work under the Environmental-Social Program; and
14 similarly, because there were no pipelines proposed
15 over any portion of the Mackenzie Delta during the
16 period of the studies, no particular attention was
17 given to the Mackenzie Delta as an area of study, al-
18 though some agencies did extend their studies to the
19 edge of the Beaufort Sea; and some studies such as the
20 vegetation mapping project within the Forest Management
21 Institute, were geographically defined in a narrow
22 band to reduce field costs. In that case vegetation
23 was mapped in a corridor that was arbitrarily defined
24 for mapping purposes, and this corridor varied from
25 ten to forty-five miles in width and included most
26 of the alternative routes proposed by industry up to
27 1973; and in contrast, studies of other things that
28 move, such as water or fish or migratory animals
29 covered a bigger area.

30 Q You mentioned earlier

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1 that one of the original terms of reference of the
2 Environmental-Social Program was to identify and
3 recommend acceptable pipeline routes based on
4 environmental and social considerations. Was this
5 done?

6 A No specific route was
7 ever defined by Government. As I indicated earlier
8 there were only general statements in the 1972 Pipeline
9 Guidelines which indicated that the Government of
10 Canada was prepared to receive and review applications
11 to construct one trunk oil pipeline and/or one
12 trunk gas pipeline within certain broad "corridors"
13 as defined in the 1972 Guidelines. These broad corridors
14 were along the Mackenzie Valley from the Arctic coast to
15 the provincial boundary and across the northern part of
16 the Yukon territory either adjacent to the Arctic coast
17 or through the northern interior region from the
18 boundary of Alaska to the general vicinity of
19 Fort McPherson. But the Environmental-Social
20 Program did not study alternative routes outside of
21 these corridors nor recommend specific preferred routes.

22 Q Were you involved in the
23 preparation of the 1972 Pipeline Guidelines?

24 A Yes, I was, because in
25 late December 1971, Dr. Fyles, as Pipeline Co-ordinator
26 from the Department of Energy, Mines and Resources,
27 and I, as similar Co-ordinator from Environment Canada
28 were asked to draft proposed new guidelines dealing
29 with the corridor concept and the environmental
30 aspects of a pipeline application, and at the same time

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1 various other members of the Environmental-Social
2 Program, and representatives of the Department of
3 Indian and Northern Affairs began drafting new
4 guidelines for the social aspects of a pipeline
5 application. In this initial division of labour
6 I gave my attention to drafting, to the first
7 drafting of the environmental guidelines that outline
8 some of the current environmental concerns of the
9 Government and some of the suggested topics for
10 response to the environmental concerns, and Dr.
11 Fyles gave his initial attention to guidelines
12 relating to the corridor. I should stress though,
13 after this initial division of labour by subject
14 matter, the entire document that ultimately became
15 the 1972 Expanded Pipeline guidelines was a co-operative
16 effort contributed to by many people.

17 Q What is your understanding
18 of the intended purpose of these guidelines?

19 A I think that the
20 1972 Guidelines were written to provide a fuller
21 explanation of Guideline No. 6 that had been published
22 in the 1970 Pipeline Guidelines. The original
23 Guideline No. 6 of August 1970 required that any
24 applicant must document the research conducted and
25 submit a comprehensive report assessing the expected
26 effects of the project upon the environment. Because
27 Canada does not have specific statutory requirements
28 for the preparation of environmental impact statements,
29 such as required of licencing agencies under the
30 National Environmental Policy Act in the United States,

1 there was uncertainty by the various pipeline
2 study groups as to what might be required in the
3 form of a comprehensive report to assess the expected
4 effects of their project upon the environment.
5 The desire on the part of the industrial study
6 groups to remove this uncertainty was, I think,
7 the main reason why the Environmental-Social Committee
8 asked the Environmental - Social Program to draft
9 expanded guidelines. As indicated in the second
10 sentence of the environmental portion of these
11 guidelines, their purpose was to indicate to potential
12 applicants some of the major topics that should be
13 included in such an environmental assessment and they
14 were not to be construed as environmental protection
15 requirements, and that point was made very clear in
16 the last sentence on page five of the 1972 Guidelines
17 which reads:

18 "These guidelines are not to be construed
19 as substitutes for the requirements of
20 applicable acts, ordinances or regulations."

21 In summary of that then,
22 the 1972 Guidelines were general instructions as to
23 the subject matter that should be included with an
24 application to allow that application to be properly
25 assessed. They were clearly not guidelines or
26 draft regulations on how to protect the environment.
27 I feel, therefore, that when the applicants state
28 that they have fulfilled the guidelines with the
29 implication that they have met the necessary
30 environmental protection stipulations to allow a

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1 pipeline to be built, that that is synonymous with
2 saying that the proposal is to build a pipeline to
3 meet non-existent protection requirements. As an
4 example of that, on page 7 of Appendix C of the
5 Phase III evidence presented by Canadian Arctic
6 Gas, it is stated that the expanded DIAND guidelines
7 require that a system be established for monitoring
8 environmental side effects during and after construction.
9 The point that I am trying to make is that the 1972
10 Guidelines have no such requirement at all. These
11 guidelines simply suggest that specific proposals
12 or specific information be presented on various
13 topics, including information on how the applicant
14 would plan to monitor the environmental side effects
15 during and after construction.

16 In the same context, the
17 fisheries expert for Canadian Arctic Gas, statement
18 that he is satisfied that from a fisheries point
19 of view the pipeline can be built "within the require-
20 ments of the DINA Northern Pipeline Guidelines";

21 as stated on page 29 of the Phase III evidence, and
22 the applicant's mammal expert's statement that
23 "insofar as my discipline is concerned, the pipeline
24 can be built within the requirements of the DINA
25 Northern Pipeline Guidelines", page 60 of the Phase
26 III evidence. These are meaningless sentences as
27 far as meeting requirements for environmental protection
28 are concerned. Such requirements are found, instead
29 in the relevant environmental protection legislation,
30 such as, the Territorial Lands Act, Migratory Birds

1 Covention Act, the Fisheries Act, the Canada Wildlife
2 Act, and the Game Ordinances of the Northwest Terri-
3 tories and the Yukon.

4 Q Earlier you mentioned
5 Guideline No. 4 of the 1972 Expanded Pipeline
6 Guidelines. Can you describe what was done in
7 connection with this guideline?

8 A When I read that guideline
9 the last sentence indicated that "statements announcing
10 the above will be released through the office of the
11 Director, Environmental-Social Program, Northern Pipe-
12 lines." The Environmental - Social Program has not
13 released specific reports which impose restrictions
14 concerning route or pipeline activities or which
15 exclude certain areas from pipeline construction,
16 and in addition, the report of the Pipeline Application
17 Assessment Group did not make recommendations, per se,
18 regarding what should or should not be done. However,
19 several reports published by the Environmental-Social
20 Program do contain recommendations on areas that should
21 be avoided, or if avoidance is impossible, then special
22 precautions would be required; and in addition the
23 environmental-Social Program did go so far as to
24 recommend to the Enviromental-Social Committee that
25 one area, namely the Campbell Lake region near Inuvik
26 be identified as an exclusion area within the
27 context of Guideline No. 4.

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1 In addition, maps prepared
2 by the environmental social program under the title:
3 "Mackenzie Valley & Northern Pipelines,
4 Regional Analysis,"
5 and these maps have been placed on open file No. 106;
6 these maps addressed themselves to the requirements
7 of guideline No. 4 but the step that is still missing
8 is that the environmental social program has not issued
9 a specific report, any report that contain the
10 sentence:

11 "In accordance with guideline No. 4 of the
12 1972 expanded pipeline guidelines the following
13 areas are hereby declared out of bounds for
14 pipeline construction."

15 I should point out that the environmental social program
16 did indicate that this Inquiry could make more specific
17 recommendations, and this was stated in the introduction
18 to the "Regional Analysis", which is open file No. 106,
19 where we see the words:

20 "It is possible that Mr. Justice Berger's
21 Inquiry will identify further geographic areas
22 of specific environmental and social concern
23 or sensitivity."

24 THE COMMISSIONER: Excuse me,
25 Dr. Peterson, I think we'll just stop a few minutes for
26 coffee now.

27 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

28 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

29 MR. ANTHONY: Mr. Commissioner,
30 I believe that Mr. Peterson has discussed the E.S.P.

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1 file No. 6, and that is a map showing these particular
2 areas, and that also is going to be tabled with this
3 Inquiry.

4 Q Dr. Peterson, can you
5 describe the kinds of areas that have been identified
6 for consideration under guideline No. 4 which you
7 think should be considered in the fulfilment of this
8 guideline?

9 A My first response to your
10 question is that such a task should be done comprehen-
11 sively, presumably by joint efforts between profession-
12 als on the staff of this Inquiry and by experts in the
13 appropriate agencies of government. I cannot give
14 a comprehensive answer to your question but can give
15 a few examples of the kinds of areas that should be
16 seriously evaluated in the context of guideline No. 4.

17 Examples of areas that I
18 think should be --

19 THE COMMISSIONER: Excuse me,
20 Dr. Peterson, this particular guideline has been dis-
21 cussed before, and just so I'm clear on this, you're
22 saying that you are advancing these areas for consider-
23 ation as geographic areas of specific environmental and
24 social concern or sensitivity, where there should be
25 a complete exclusion of pipeline activities or restric-
26 tions upon pipeline activities. That's where we're at,
27 is it?

28 A Yes, but I want to make
29 it clear, Mr. Commissioner, that there are two classes
30 -- there are two lists here, based on the initial wording

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1 of guideline No. 4. Guideline No. 4 said that it would
2 identify -- government would identify areas in which it
3 will impose specific restrictions, that's one class
4 of area; and possibly areas excluded from pipeline
5 construction.

6 Q Right.

7 A That's a different class,
8 and I have made two lists on page 9 of my testimony.

9 Q I mention it because I
10 recall the very first day I held a hearing in this
11 Inquiry, it was a Preliminary Hearing on April 22nd
12 1974, that somebody got up and referred to this guide-
13 line and asked me if any areas had been designated. I
14 didn't know, but it turned out none had been. So I'm
15 pleased that even though you've left the Committee
16 you're about to offer some designation. Carry on.

17 A Examples of areas that
18 should be considered for special restrictions if outright
19 avoidance by pipeline construction and all related
20 activities, is impossible would be the following:

21 The mapped area, a very important
22 wildlife habitat for beaver, muskrat, moose and waterfowl
23 along the Kakisa River west of Tathlina Lake, and that
24 is shown on open file, wildlife map of open file ESP-106.

25 Areas mapped as highly sensitive
26 to disturbance on the aquatic sensitivity maps of open
27 file 106, and examples of these are part of the Hare
28 Indian River from its mouth to a point about 15 miles
29 east of the Mackenzie River; similarly segments of the
30 Willowlake River, Trail River, Harris River, Jean Marie

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1 River, Trout River, Great Bear River, and Old Crow
2 River.

3 Third example are stream
4 systems identified for avoidance or special restrictions
5 to protect the fishery resource and these include the
6 delta of the Mackenzie River, Big Fish River, Rat River,
7 Trout River, Jean Marie Creek, Peel River, mouth of
8 Arctic Red River, the drainage of Swan Lake and Swan
9 Creek, the drainage of Threeday Lake and Stewart Creek,
10 and the Great Bear River as outlined in an environmen tal
11 social program report by Stein and co-authors, 1973,
12 and in a report by Jessop & co-authors, 1974.

13 Q And that's not the
14 drainage of the Great Bear River, that's the --

15 A That is the Great Bear
16 River.

17 Q -- Great Bear River.

18 A Right, and these examples,
19 of course, will be discussed in more detail by later
20 witnesses who will present testimony on the fishery
21 resource.

22 Lastly, areas mapped as
23 highly susceptible to terrain and surface damage. if
24 they cannot be avoided, should be treated with special
25 care, and examples of such areas are shown on maps
26 available in open file 102, and some examples of these
27 will be given during testimony by Mr. Zoltai.

28 Now examples of areas that,
29 in my opinion, should be considered for outright avoid-
30 ance by pipeline construction and all related activities

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1 would be the following: The proposed Dolomite Lake,
2 Campbell Lake, I.B.P. Ecological Site which has also
3 been proposed for special protection under the Canada
4 Wildlife Act, and let me add that Appendix "F" of
5 my prepared testimony provides some detail on that.

6 Q Can we just glance at that
7 for a moment, Dr. Peterson? That's on the east side
8 of the delta.

9 A Yes, it is, just south
10 of the Inuvik Airport.

11 Q Carry on.

12 A Any areas proposed as
13 national landmarks such as Bear Rock, Mount Gooday, the
14 Ramparts and the west bank of the Mackenzie River at
15 Fort Good Hope, and these examples have been outlined
16 on pages 377 and 378 of the report of the Pipeline
17 Application Assessment Group and also the proposed
18 national landmark in pingo areas of the Tuktoyaktuk
19 Peninsula. Any areas of concentrated archaeological
20 sites such as those near the proposed pipeline crossings
21 of the Firth, Hare Indian, and Wilbwlake River, as
22 outlined on page 383 of the Pipeline Application
23 Assessment Group Report, or the archaeological site at
24 Fort Alexander along the Willowlake River as outlined
25 on page 95 by Janes in an environmental & social program
26 report.

27 Any stream segments that have
28 open water in winter such as occur along the Malcolm
29 and Firth Rivers, or on Fish Creek in the Yukon, again
30 as outlined on page 312 of the report of the Pipeline

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1 Application Assessment Group, or the Ochre River open
2 water area mentioned on page 310 of the same report.

3 Any areas mapped as very
4 critical exclusion areas on the wildlife maps of
5 open file 106. By way of summary, these areas are on
6 -- are in the eastern fringes of the Mackenzie Mountains
7 from 64 degrees north to 65 degrees 20 minutes north;
8 there are other examples in the British Mountains
9 along the Firth River, on the Yukon North Coast around
10 Shoalwater Bay and Phillips Bay, at the mouths of the
11 Firth and Malcolm Rivers, on the spit near Ptarmigan
12 Bay, and on the spit that extends south from the south-
13 west corner of Herschel Island.

14 There are other examples, in the
15 Mackenzie Delta region on Mount Goodenough, around
16 Campbell Lake, on Pelly Island, on the spit just east
17 of Pelly Island, and there are four areas on the south
18 and south-east sides of Liverpool Bay and two areas
19 at McKinley Bay.

20 The next example is Horseshoe
21 Bend, in the middle channel of the Mackenzie Delta be-
22 cause of its importance for spawning of humpback
23 whitefish, as described on page 87 by Jessop and co-
24 authors.

25 Other examples are the portions
26 of proposed I.B.P. ecological sites that are meant to
27 be undisturbed experimental control areas for long-
28 term comparison with disturbed sites.

29 Lastly, the spectacular ^{granite} remnants
30 that occur on the unglaciated hills in the western part

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1 of the Old Crow Range should be given outright protec-
2 tion against any pipeline-related disturbances as
3 outlined in paragraph G-2 to 8 on page 162 of Report
4 74-17.
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That is the end of the suggested examples that I am putting forward. I have not documented in detail what each of these suggested exclusion areas would mean in terms of presently proposed pipeline routes and proposed locations of facilities required for pipeline construction. However, I do not think that the recognition of these proposed exclusion areas would prevent the grant of a right-of-way for pipeline construction. They may require routing changes and relocation of some of the proposed pipeline related facilities. For example, any exclusion area declared around Fort Alexander could seriously hamper land use activities if either of the applicants are still planning a river crossing near the mouth of Willowlake River. Also, the alternative cross delta route as shown on Alignment Sheet 1K-0200-1003, passes close to but not through, the Shoalwater Bay "very critical exclusion area", as shown on Open File 106; and lastly, removal of aggregate in the Campbell Lake area would conflict with the proposed establishment of this area as an IBP ecological site. However, the cross delta alternative route is further from this area than the originally proposed prime route.

Finally, I want to stress that it does not matter, in my opinion whether some of these examples are quite a few miles from the proposed pipeline routes. I feel if this task is worth doing at all, it is worth doing in relation

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1 to all events that will follow from pipeline con-
2 struction, not just in relation to pipeline right-
3 of-way itself.

4 Q Dr. Peterson, I would
5 next like to turn to your involvement in the
6 International Biological Program and ask you some
7 questions with respect to the International Biological
8 Program and your involvement in it.

9 A The main purpose of
10 the International Biological Programme, which is
11 abbreviated I.B.P., was to study biological productivity
12 of ^{the earth's} surface in relation to human welfare. This
13 research soon made it very clear that outdoor
14 laboratories in which measurements of productivity
15 are to be made, require some kind of assurance that
16 the outdoor laboratory is still going to be there to
17 allow remeasurement in five, ten, or twenty years
18 as the need may arise. For this reason, one section
19 of the International Biological Programme was called
20 Conservation of Terrestrial Communities and was
21 abbreviated C.T. and it devoted its efforts to
22 an inventory of areas suitable for preservation as
23 long-term, outdoor laboratories. The work of I.B.P-
24 C.T. in Canada has been outlined in a separate paper
25 recently published in Nature Canada, and this program
26 was carried out in Northern Canada by two panels
27 of scientists. Panel 9 dealt with the area north
28 of the treeline, including the region around the
29 Mackenzie Delta and the Northern Yukon. Panel
30 10 dealt with the forested areas in the Yukon and

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1 Northwest Territories. Most of these I.B.P.-C.T.
2 panels have recently published detailed documents
3 that describe their proposed ecological sites in
4 Northern Canada, and in addition, Canada is a partici-
5 pant in a UNESCO program on Man and the Biosphere.
6 The most recent report of the Canada Man and the
7 Biosphere Program deals with guidelines for the
8 selection of biosphere reserves in Canada. The
9 title of that report is, in fact, Guidelines for the
10 Selection of Biosphere Reserves in Canada.

11 MR. ANTHONY: Mr. Commissioner,
12 Dr. Peterson has referred to four different reports
13 which are going to be tabled with this Inquiry. The
14 first one, the "Ecological Reserves in Canada," the
15 work of the I.B.P.-C.T.; secondly, the "Ecological
16 Sites in Northern Canada"; thirdly, "Ecological Sites
17 in Subarctic Canada"; and finally, the report that
18 he has just referred to, and these four reports are
19 also tabled.

20 A As for my personal
21 involvement in the I.B.P. Programme, in the late
22 1960's I worked within the Canadian Forestry
23 Service, Alberta and Northwest Territories, Yukon
24 Region, to encourage that agency to assist with the
25 inventory work for candidate ecological reserves that
26 serve as long-term outdoor laboratories under I.B.P.
27 Then in 1970 - '71 I was biological advisor under a
28 Canada Council Research Grant for a group of legal
29 researchers who were developing model legislation for
30 the establishment and management of ecological

1 reserves.

2 In January 1974 I took
3 on an assignment under contract from I.B.P. to work
4 as their national co-ordinator for ecological
5 reserves. This was on behalf of the Canadian
6 Committee of Scientists who had been involved with
7 I.B.P. since its beginning in 1964. The program
8 under I.B.P. is now officially ended, but I am
9 continuing to work on behalf of the same scientists
10 who now function as the Associate Committee
11 on Ecological Reserves under the National Research
12 Council.

13 In addition to these
14 activities, in the summer of 1975 I supervised the
15 preparation of seven formal applications for
16 ecological sites in the Northwest Territories and the
17 Yukon. These applications were prepared on behalf
18 of panels 9 and 10 of the Canadian I.B.P. organization
19 and they are responsible for proposing Canadian
20 I.B.P. sites north of 60°. The seven applications
21 that were prepared in our office were submitted
22 by panels 9 and 10 to the Minister of Indian and
23 Northern Affairs on September 16, 1975.

24 Q Could you describe
25 how ecological reserves relate to the proposed
26 pipeline projects?

27 A Before going into
28 details of how the proposed pipeline project would
29 relate to those I.B.P. sites that have now been sub-
30 mitted as formal applications to the Department

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1 of Indian and Northern Affairs, I want to stress some
2 of the general purposes of I.B.P. sites and indicate
3 the various kinds of sites visualized in a nationally
4 representative system of outdoor laboratories.

5 The first point to make
6 is that proposed ecological reserves can range all
7 the way from small, single-use areas that are for
8 outright preservation of some important biological
9 or ecological feature, to large multiple-use areas
10 that could be zoned and managed to allow protection
11 of biological features and concurrent industrial
12 development in adjacent zones. Therefore, one cannot
13 simply look at the map of the ecological sites proposed
14 by I.B.P. panel 10, in the report that has been
15 tabled, and automatically say that these sites should
16 be declared out of bounds for pipelines and other
17 similar industrial projects. Some of them should be
18 declared out of bounds and some of them need not
19 be. In fact, included in the seven formal applications
20 for ecological reserves that have now been filed by
21 the I.B.P. Panels with the Department of Indian and
22 Northern Affairs, are at least three sites that would
23 be specifically designed to monitor the side effects
24 of industrial developments. One of these proposed
25 ecological sites is proposed in the area of a proposed
26 mine. The intention here would be to gather detailed
27 base line information before the mine is established and
28 to continue such measurements during and after operation
29 of the mine; and as outlined on page four of the Canadian
30 Man and the Biosphere Report No. 6 which was tabled

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1 a few minutes ago, one important kind of reserve would
2 be areas set aside at the commencement of new major
3 engineering projects to act as bench-marks or outdoor
4 laboratories for documentation of the before situation,
5 the after situation, the natural rate of recovery,
6 the assisted rate of recovery, and development of
7 new ecosystems, and this type of ecological reserve
8 can be extremely important for projects of this
9 kind, and it is for this reason that the entire
10 concept of ecological reserves relates to the subject
11 matter of this Inquiry.

12 Now, let me add that this
13 proposed link between an industrial project and natural
14 areas that would serve as long-term outdoor laboratories
15 to measure conditions in the undisturbed state, and
16 also conditions in the adjacent disturbed areas, has
17 been recognized by Canadian Arctic Gas and I assume
18 by the other applicant, too. For example, I want
19 to quote from page 37 of the Canadian Arctic Gas
20 Phase III evidence where there is reference to the
21 interdisciplinary studies undertaken at Chick Lake
22 in the Northwest Territories. Also on page 8 of the
23 Phase III evidence, there is reference to a study
24 program in which the objective was to establish
25 the natural conditions of drainage, soil and vegetation
26 in a representative study area in the Mackenzie
27 Valley, prior to construction of either a highway or a
28 pipeline. A further objective of such work by the
29 applicant is to remeasure the same site during
30 construction and for a period of time following

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1 construction to check on the accuracy of environmental
2 impact predictions. Now, this is precisely the
3 kind of research objective that is implied in the
4 class of ecological reserves that are meant to be
5 monitoring sites for major industrial or public
6 works projects, and I think that the important
7 initiatives taken by the applicant in this
8 regard should be formalized in a way that sets a
9 precedent for future large industrial or public
10 works projects; and I therefore recommend that the
11 terms and conditions that go with the grant of a
12 gas pipeline right-of-way, require the legal establish-
13 ment of at least two ecological reserves that would
14 serve as long-term monitoring sites for that project,
15 and I further recommend that one such monitoring site
16 should be in the continuous permafrost zone and one
17 should be in the discontinuous permafrost zone.

18 Q Are you suggesting
19 that all I.B.P. ecological sites should be monitoring
20 sites for industrial or public works projects?

21 A No, I have been talking
22 about one class of ecological reserve that would
23 be established for that purpose. The proposed I.B.P.
24 site in the Willowlake, or Brackett Lake area is a
25 good example of this kind of ecological reserve.
26 The attached map and metes and bounds description of
27 that proposed site which is shown in appendix D
28 of my prepared testimony shows that one part of it
29 would be clearly intended as an area where long-term
30 effects of highway and pipeline construction and

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1 operation could be measured.

2 At the other end of the
3 scale, there are some proposed I.B.P. sites that would
4 be for outright protection of some endangered species
5 or perhaps some special geological feature such as a
6 hot spring. Such sites would be essentially single-
7 use areas with preservation being the management
8 objective and carefully regulated scientific study
9 being the limit of allowable disturbance.

10 Established ecological
11 sites would require management plans and in some cases
12 zoning. So any given ecological site is not likely
13 to have its entire area designated for multiple-use
14 or its entire area strictly for single use. Instead,
15 most reserves would have some part that is zoned and
16 managed for maximum preservation and other parts that
17 are meant for scientific study and a variety of
18 monitoring measurements of disturbances that happened
19 to occur there. That is why it is not necessarily
20 a contradiction to have things such as pipelines
21 passing through some parts of some reserves.

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1 Q When you speak of single
2 use of some parts of these I.B.P. ecological sites does
3 that mean that native use of land would be excluded?

4 A Not necessarily, because
5 the scientists who have proposed I.B.P. sites in the
6 north regard native people as part of the ecosystem.
7 This means that traditional uses of the land by native
8 people will be compatible with the legal establishment
9 of ecological sites. In some cases, however, it
10 will undoubtedly be necessary to develop management
11 restrictions in consultation with native people to en -
12 sure that the animal resources within ecological sites
13 are not over-harvested.

14 I would expect that one
15 arrangement for such management requirements could be
16 management goals set by native people on the basis of
17 suggestions by scientists who are familiar with the
18 special features of any individual ecological site.

19 In relation to native land
20 claims, co-chairmen of the two northern I.B.P. panels
21 have taken the position that regardless of who owns or
22 controls the land, there are certain areas that deserve
23 special protection and management. By protecting certain
24 life systems characteristic of the Yukon and Northwest
25 Territories, the proposed I.B.P. sites would not only
26 be preserving some areas for long-term study and
27 education, but would also be protecting the hunting
28 and fishing resources of the native people.

29 Q What specific recommenda-
30 tions would you make to this Inquiry about proposed

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1 I.B.P. ecological sites?

2 A In my opinion it is
3 questionable that we, as a country, should put as much
4 effort, and money, into environmental impact prediction
5 as was done by industry and government for this pro-
6 ject unless a substantial effort is also devoted to
7 actual measurement of the environmental results during
8 and after the construction period.

9 If there are going to be some
10 ecological problems as a result of this project I
11 think there should be some clinics to determine the
12 causes of the trouble. I have already recommended that
13 at least two sites be established as an integral part
14 of this project; these sites would be the outdoor
15 clinics where records would be kept. It's only in this
16 way we can -- the accuracy of future predicted studies
17 can be improved.

18 An important question then
19 is where these study sites should be located, and to
20 help answer this question I recommend to this Inquiry
21 that both applicants for a gas pipeline be invited to
22 submit formal proposals with metes and bounds descrip-
23 tions, for any long-term study sites that would serve
24 their special interests as long-term research and
25 monitoring areas. Any such proposed areas should include
26 not only the areas desired by the applicant as sites of
27 inter-disciplinary field studies but also proposals for
28 adjacent experimental control areas that would remain
29 undisturbed, at least until the pipeline project is
30 abandoned.

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1 I would further recommend
2 that if this Inquiry accepts the idea that one of the
3 terms and conditions should be formal establishment of
4 at least two ecological sites that could be integrated
5 with the monitoring requirements of the project,
6 then I recommend that the formal applications for several
7 I.B.P. sites that are now before an Interdepartmental
8 Committee be assessed in relation to these monitoring
9 needs. This step would involve detailed consideration
10 of the formal applications for the Willowlake or
11 Brackett Lake ecological site, the Caribou Hills
12 ecological site, and the Dolomite Lake-Campbell Lake
13 ecological site.

14 In relation to the proposed
15 Willowlake ecological site which is shown by
16 map in metes and bounds description in Appendix "D",
17 I urge that this Inquiry recommend the establishment
18 of this site as proposed by I.B.P. panel 10, with
19 particular emphasis on the monitoring area in the
20 south-west portion of the proposed site.

21 In relation to the proposed
22 Caribou Hills ecological site, which is referenced in
23 Appendix "E", I urge that this Inquiry recommend the
24 establishment of this site as proposed by I.B.P. panel
25 9, with particular emphasis on the establishment of a
26 monitoring area within the Devil Creek and Devil Lake
27 watershed at the north end of the proposed site. This
28 part of the proposed site could be well suited to
29 before and after studies in relation to gravel removal.

30 Finally, in relation to the

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1 Dolomite Lake-Campbell Lake ecological site, referenced
2 in Appendix "F", I urge that this Inquiry recommend
3 the establishment of this site as proposed by I.B.P.
4 panel 10, with no monitoring areas within it, and
5 with the prime land use objective being preservation
6 of ecosystems that occur there.

7 Now in addition to the three
8 proposed I.B.P. sites just described, other sites
9 proposed by panel 10 in the general vicinity of
10 proposed pipeline routes are briefly described in the
11 report entitled:

12 "I.B.P. Ecological Sites in Sub-Arctic Canada,"
13 which has been tabled today. These other proposed
14 sites include the Old Crow Basin, Firth River, Rat
15 River, south Mackenzie Delta, and the Ebbutt Hills.

16 In addition, the panel 9
17 publication entitled:

18 "Ecological Sites in Northern Canada,"
19 which was also tabled today, proposes the following
20 sites in the general vicinity of the Mackenzie Delta.
21 Canoe Lake, Garry and Pelly Islands, Toker Point and
22 Herschel Island.

23 Formal applications have not
24 yet been made for these nine proposed sites, and until
25 specific applications have been prepared for these
26 proposed sites, it is difficult to make specific
27 recommendations about them; but my understanding is
28 that the I.B.P. panel scientists would advocate outright
29 avoidance of pipeline-related disturbances in the
30 following proposed sites: Old Crow Basin, Firth River,

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1 and Garry and Pelly Islands. I believe that the other
2 proposed sites, namely, Rat River, south Mackenzie
3 Delta, Ebbutt Hills, Canoe Lake, Tokar Point and
4 Herschel Island, would be in the class of reserves
5 where appropriate zoning would allow some disturbances
6 in some parts of the I.B.P. site.

7 Because the I.B.P. panels
8 operate with limited funding and essentially volunteer
9 professional time, of interested scientists, it has
10 not been possible to prepare a formal application for
11 all of these proposed sites that lie in the vicinity of
12 proposed routes. It has also been difficult for the
13 panels to set priorities because of occasional changes
14 in the preferred routes being considered by the gas
15 pipeline applicants. For example, just very recently
16 consultants for Foothills Pipe Lines have recently
17 asked for information on proposed I.B.P. sites that
18 lie further east than those listed earlier, and these
19 additional sites of interest, of course, are in the
20 vicinity of the proposed gas distribution laterals and
21 include the Deep Bay Wood Bison Sanctuary, site 22,
22 Mills Lake and Horn River, sites 49-A and 49-B, and
23 Hart Lake proposed site, site 79, all of those are
24 described in the report tabled today.

25 Because the I.B.P. panels
26 lack funds and personnel to develop formal applications
27 for all of these sites in time to assist this Inquiry,
28 the only other general recommendation I would make,
29 Mr. commissioner, is that there be -- there continue
30 to be close liaison between I.B.P. representatives

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1 and the consultants who are advising industry on
2 alternative pipeline routes, and also close liaison
3 with staff members of this Inquiry who may be involved
4 -- who may be assessing various areas recommended for
5 outright exclusion of pipeline construction and related
6 activities.

7 Q Thank you, Dr. Peterson.

8 Mr. Zoltai, I'd like to turn to you, if I may, and
9 ask you if you'd please describe the terrain studies
10 that you conducted in the Mackenzie Valley and Yukon?

11 WITNESS ZOLTAI: I conducted
12 studies on vegetation, land form and permafrost relation-
13 ships, chiefly in the northern part of the Mackenzie
14 Valley and Northern Yukon in 1971, '72, and '73. The
15 objectives of these studies were to assess the
16 relationships between the vegetation cover and the
17 near-surface permafrost conditions on different types
18 of land in various climatic zones. A further aim was
19 to develop a rating of the susceptibility of the terrain
20 -vegetation complex to disturbances. The results of
21 these studies were published by the Environmental
22 Social Program in Volumes 73-4 and 74-5. A further
23 volume (74-44) is in press. In addition, several
24 papers were published in scientific journals.

25 MR. ANTHONY: Mr. Commissioner,
26 Volume 73-4 and 74-5 have been tabled with the Inquiry
27 and in addition the Volume 74-44 is now available and
28 this also will be tabled.

29 Q You mentioned that your
30 detailed studies were in the northern part of the

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1 Mackenzie Valley and the Northern Yukon. Did you also
2 have the opportunity to observe terrain conditions
3 throughout the entire pipeline study area?

4 A Yes. All the studies
5 in '71 and 1972 were conducted north of Sans Sault Rapids
6 and south of Inuvik, but extending to the Alaska border
7 in the west. In 1973 detailed studies were conducted
8 along the entire length of the Mackenzie Valley from
9 Fort Simpson to Tuktoyaktuk, including the North Slope
10 of Yukon. This provided an opportunity to become
11 familiar with terrain-vegetation conditions throughout
12 the entire pipeline study area.

13 Q In your view, how are
14 permafrost, terrain, and vegetation disturbance inter-
15 related?

16 A Permafrost develops under
17 natural conditions where the loss of heat from the soil
18 is greater than the influx of heat. In many areas the
19 organic mat, ^{being} composed of living and dead plants, insula-
20 tes the ground in summer sufficiently to prevent the
21 heating of the soil and thereby preserves the ground frost.
22 In the development of permafrost, soil conditions, soil
23 moisture conditions, soil texture and the aspect of the
24 land will be crucial, as these affect not only the
25 energy heat or heat input into the soil, but also they
26 determine the kind of vegetation that will grow at
27 any given site. Any disturbance, be it man-made or
28 natural, that disrupts or destroys the insulating
29 organic layer will allow access of heat into the ground
30

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1 and hence cause a lowering of the permafrost table.

2 In the natural system the terrain and vegetation are
3 in balance with permafrost conditions, as determined
4 by the prevailing climatic conditions. Any change
5 in the terrain or vegetation, be it gradual or catas-
6 trophic, will cause a change in the permafrost.

7 Q Would you list some of
8 the specific hazards created by the northern terrain
9 conditions found along the proposed pipeline routes?

10 A The special hazards
11 relate to permafrost conditions and to proposed pipe-
12 line construction that could include long-term changes
13 in the environment and may threaten the integrity of
14 the pipeline. Some of these hazards are:
15 1. Disturbance or destruction of the insulating
16 organic mat would include, induce a lowering of the
17 permafrost table. The frozen water held in the top
18 part of the permafrost table will be released, saturat-
19 ing the ground unless allowed to drain away. The
20 sub-surface ice bodies may be exposed to melting
21 and initiating the melting and flow of large masses
22 of materials. On the level areas, the surface will
23 subside and thermokarst ponds may be initiated.

24 The disturbance of organic
25 layer may be drastic as in fires or from stripping
26 during construction activity, or may be subtle as in the
27 gradual destruction of the living moss after cutting
28 the trees during right-of-way clearing, allowing the
29 growth of less efficiently insulating species. It is
30 therefore essential that the insulating quality of the

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1 ground be preserved or reinstated.

2 2. In the areas underlain by permafrost the infiltra-
3 tion of precipitation into the ground is inhibited by
4 the permafrost layer. The excess moisture is drained
5 by downhill seepage in the active layer, over the
6 permafrost. The chilling effect of the buried pipeline
7 may reduce the thickness of the active layer over the
8 pipe. The sub-surface drainage normally passing through
9 this layer could be impeded to a point where it would
10 exit from the ground near the pipeline or at some
11 point upslope from the pipe, thus altering the sub-
12 surface drainage pattern and may create icings in the
13 early winter months which could alter surface drainage
14 in the following spring.

15 I'm aware of the mitigating
16 measures proposed by the applicant which would allow
17 surface drainage across the pipeline by creating
18 breaks in the berm as required. The breaks would be
19 armoured by granular fill mainly to protect against
20 erosion. However, in order to permit sub-surface drainage
21 the granular fill must be deeper than the permafrost
22 table in the upslope area. The placement of porous mater-
23 ials, preferable gravel under the breaks would tend to
24 depress the permafrost table over the pipe and permit
25 sub-surface drainage.

26 3. In discontinuous permafrost areas unfrozen areas
27 occur during very wet organic deposits. These are in
28 the fens, most of which serve as drainage channels. In
29 this area natural processes cause the permafrost to thaw
30 and build up in different parts of the deep peat

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1 deposits. The buildup of permafrost can occur in
2 very wet fens but never in such manner as to block the
3 natural drainage.

4 Now the chilled pipeline
5 will induce permafrost formation by freezing the wet
6 peat and the underlying mineral soil, thereby creating
7 a strip of impermeable material through the fen. This
8 frozen strip will probably project well above the
9 surface of the fen due to ice accumulation in the
10 underlying mineral soil. This frozen strip, if
11 cutting across the fen, would act as a dam causing
12 ponding upstream and desiccation downstream. Continuing
13 seepage during the winter may cause icing conditions.

14 A further consequence of the
15 buried chilled pipeline in very wet peat deposits
16 will be development of a frozen shell of peat and
17 ice around the pipe. As water is freely available, ice
18 will tend to segregate around the pipe, resulting in
19 serious heaving.

20 Q We have heard much evidence
21 about ponding. Why is it important to prevent ponding
22 in areas underlain by permafrost?

23 A The thermal qualities of
24 water are different from soil materials, frozen or
25 unfrozen. Water or water-saturated soil will transmit
26 heat far more readily than drier soils which has air
27 voids. If water is allowed to accumulate on the surface,
28 thawing of the underlying permafrost will take place,
29 resulting in an increased active layer thickness or
30 in the complete disappearance of the permafrost. In

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1 highly icy materials this would lead to severe subsidence
2 through thermakarst development , further deepening the
3 pond. In such areas a progressive failure of the
4 edges of the pond will take place, enlarging the ponded
5 area laterally.

6 Q For protection of the
7 terrain, what recommendations would you make about
8 ponding?

9 A My general recommendation
10 would be that no structure must be allowed to disrupt
11 the natural drainage and cause prolonged ponding.

12 Now this would require that
13 drainage breaks in the berm over the pipeline must be
14 adequate both in spacing and in size to drain quickly
15 any runoff or seepage waters. The argument presented in
16 Phase 2 evidence of Canadian Arctic Gas that ponding
17 on all but the flattest terrain will be restricted to
18 the right-of-way is irrelevant as the thermokarst sub-
19 sidence is progressive and may affect the bordering
20 area and eventually threaten the integrity of the
21 pipeline.

22 Now drainage through gravel
23 pads constructed for ancillary structures must also be
24 provided. Borrow pits located in or underlain by ice-
25 rich materials should be provided with drainage, and the
26 slopes should be stabilized before abandonment.
27 Burial sites for combustible waste must be selected and
28 constructed in such a manner that ponding and thermokarst
29 development will be avoided.

30 Q Mr. Zoltai, what is a

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1 palsa and how is it formed?

2 A Palsas are defined as
3 mounds of peat, having perennially frozen cores. In the
4 Mackenzie area, they occur as islands or peninsulas in
5 very wet fens or ponds, rising abruptly to a height
6 of five to 15 feet. This height is due mostly to ice
7 accumulation at the peat mineral soil interface and
8 in the upper part of the mineral soil.

9 Under natural circumstances,
10 palsas begin to form in very wet fens in response to
11 microclimatic changes. The common impetus is the dev-
12 elopment of a cushion of sphagnum which is a kind of
13 moss, which is a far better insulator than the original
14 fen vegetation. This insulation is sufficient to prevent
15 the melting of the seasonal frost and hence induce
16 and preserve the permafrost. The frozen peat expands,
17 further elevating the small cushion, enhancing the
18 insulation cover qualities of the peat. Eventually
19 the permafrost core will thicken, reaching the mineral
20 soil. Moisture will be drawn into the frozen core as
21 moisture tends to migrate from the warm to the cold
22 areas. As silt permits the migration of water more
23 readily than peat, most water will be drawn to the
24 peat mineral interface, and to the upper part of the
25 mineral soil. This water will freeze, greatly increas-
26 ing the height of the developing palsa.

27 Q How does palsa formation
28 relate to proposed construction of a refrigerated
29 gas pipeline?

30 A In the discontinuous

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1 permafrost zone the average thickness of peat in fens
2 is eight to 10 feet, thus if the pipe is placed in the
3 peat as proposed, a refrigerated line would be
4 at the peat mineralsoil interface. As the peat would
5 freeze around the pipe, water which is freely available
6 in the fen would be drawn to the frozen zone. This
7 would result in the development of layers very rich
8 in ice, much like those at the peat mineral interface
9 in a palsa. This would result in the development of
10 an artificial palsa induced by the freezing temperatures
11 in the pipe.

12 Q Do you think that the
13 artificial palsa formation/^{you have described}could cause damage to a
14 pipeline?

15 A Accumulation of thick
16 ice is inevitable around the refrigerated pipe. As the
17 ice buildup proceeds, the pressures developed will
18 move the pipe in the direction of least resistance, that
19 is upward. This upward thrust will take place in the
20 fen, but not in the surrounding areas where the pipeline
21 is firmly fixed in the ground. In my opinion, the stres-
22 ses thus developed could easily damage the pipeline.

23 Furthermore, the frozen core
24 will act as a dam across the fen. This would force the
25 natural drainage over the ice dam. In the winter the
26 water could be forced over the frozen surface of the
27 fen, causing severe icing. This would further jeopardize
28 the safety of the pipeline.

29 Mr. Commissioner, I would like
30 to make it clear that these remarks are based on

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1 observations of palsa development in the natural
2 environment and not on geophysical studies. These are
3 based strictly on my own observations rather than
4 precise measurements of geophysical nature.

5 Now, unfrozen fens occur in
6 the discontinuous permafrost zone along the proposed
7 pipeline routes from the Alberta-Northwest Territory
8 border north to about the 68th degree latitude, about
9 half-way between Arctic Red River and Inuvik. Any
10 terms and conditions designed to overcome the formations
11 of frozen dams that would impede the natural drainage
12 to fens would be required at least as far north as
13 68 degrees latitude, both on the prime route and the
14 interior alternative route.

15 Q Do you think that the
16 construction methods as proposed in the application in
17 Phase 2 evidence will prevent the heaving of the
18 pipeline in fens?

19 A The proposed construction
20 methods did not consider the problems caused by the
21 fens. According to the proposal, heaving would be
22 counter-acted by increasing the load over the pipe.
23 However, the peat in fens is not competent to hold
24 such a load in place, therefore the weights would have
25 to be attached to the pipe. As none of the applicants'
26 test installations encountered conditions present in
27 the fens, it is not known whether this method would
28 be effective in overcoming artificial palsa formation.
29 The construction methods, as outlined in the application
30 and Phase 2 evidence are not believed to be designed

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1 for construction in wet unfrozen fens.

2 Q You have mentioned a
3 special characteristic of fens and have stressed that
4 it is important to ensure that generated permafrost
5 does not interfere with drainage in such areas. What
6 recommendations would you make to ensure that a chilled
7 gas pipeline would not interfere with such drainage?

8 A My recommendation would
9 be to develop a construction method which would
10 avoid contact between a cold pipeline and unfrozen,
11 very wet peat. One such mode of pipeline construction
12 would be the placement of the pipeline on elevated
13 supports. Also, Mr. Commissioner, in a recent visit
14 to Alaska, I learned of a method that may have some
15 application in this matter, and in Alaska they usually
16 put the pipes, the heated oil pipes on supports in
17 permafrost areas; but in some areas they cannot avoid
18 putting the heated oil line in permafrost, in frozen
19 ground, and in this instance they are proposing to
20 put a refrigerated jacket around the pipe. Now, this is
21 just an idea that perhaps this process could be reversed
22 in our case, in other words putting perhaps a heated
23 jacket around the refrigerated line if it has to cross
24 such hazardous areas.

25 Q Would it be possible, in
26 your opinion, to repair any such damage to a pipeline
27 without significant terrain damage if the repair had
28 to be done over a thawed surface?

29 A The thawed surface of a
30 fen cannot be traversed by wheeled, tracked or balloon-

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1 tire equipped vehicles without significant terrain
2 damage. Any repair operation involving travel on the
3 surface of thawed fens would cause a great deal of
4 surface damage. The use of air-cushion vehicles or
5 helicopters is possible if the repairs can be carried
6 out on a nearby surface that offers solid footing.

7 THE COMMISSIONER: Mr. Anthony;
8 I take it that we are moving to a new subject, so far
9 as hummocky terrain is concerned.

10 MR. ANTHONY: Yes.

11 THE COMMISSIONER: I agreed to
12 speak to the Rotary Club of Yellowknife today and I
13 have to be there in a few minutes, so maybe you wouldn't
14 mind if we adjourned now and came back at two o'clock.
15 Would that be all right, Mr. Scott?

16 MR. SCOTT: Sure.

17 THE COMMISSIONER: Miss Crosby
18 usually distributes copies of this speech, and it is
19 always the same speech that I deliver on these gather-
20 ings. I think Miss Hutchinson can supply any of the
21 participants who are anxious to read it again with copies.
22 There are some pages that are new, with insignificant
23 changes just to avoid boring myself to death as I
24 read it.

25 MR. SCOTT: May I take two
26 minutes to report on my daily count on the caribou
27 reports?

28 THE COMMISSIONER: Yes.
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1 First, the so-called
2 Geist memoranda to Commission Counsel, we have now
3 gotten in touch with Dr. Geist and he has agreed that
4 it should be released. I would ask that it be given
5 the next exhibit number. It is directed, Report
6 to the Berger Commission, and of course, as I have
7 said before, that is perhaps erroneous, it is a
8 report to Commission Counsel. Its title is "Har-
9 assment of Large Mammals and Birds with a Critique
10 of the Research Submitted by Arctic Gas Study Limited
11 on This Subject", by Valerius Geist, Faculty of
12 Environmental Design, University of Calgary.
13 I would ask that it be an exhibit and for copying
14 purposes I would just like to retain it and it is
15 about a hundred pages, so the copying will be difficult
16 and perhaps Mr. Marshall and I can discuss how that
17 can best be done.

18 That is item one. Item two,
19 there appears to be a draft report on the Porcupine
20 caribou herd by DeBock and Serendi We have not
21 yet got any authority with respect to that, though I
22 hope to have by early next week.

23 Item three, there is no
24 report of which we have any knowledge, or notes or
25 memoranda, draft, or final in form, with respect to
26 the Bluenose caribou herd. Now, if Mr. Marshall thinks
27 there is, if he can give me ^a further lead, I will try
28 and trace it down, but I understand that there isn't.

29 MR. MARSHALL: Mr. Scott,
30 you have been my only source of information on this

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1 point and I can't help you any further. I appreciate
2 your advising us on these other matters and I would
3 like to speak to you about getting copies of that
4 report.

5 THE COMMISSIONER: All right,
6 we will adjourn until 2 o'clock then.

7 (PROCEEDINGS ADJOURNED UNTIL 2 P.M.)
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1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 MR. MARSHALL: Mr. Commissioner,
3 perhaps before my friend starts again I should put on
4 the record that I've gone through the list of reports
5 that we requested from CARC again, and the bundle that
6 Mr. Anthony had, and we found we're still short nine.
7 I've now got one of them, and I understand the other
8 eight will be forthcoming very soon.

9 MR. ANTHONY: It's just a
10 matter of getting them from Mr. Bayly's office and
11 photo-copied and they will be over. We have one
12 slight problem of no place to keep reports other than
13 trying to slot them in hotel rooms or other offices,
14 but reports are there and a couple I had because I
15 was raising a point this morning and I'll now turn
16 those over, and the rest will be available to Mr.
17 Marshall.

18 Q Mr. Zoltai, if we can
19 return again to your evidence before this Inquiry,
20 and you discussed this morning concerns with respect
21 to palsa formation, I'd like to now turn and ask you
22 some further questions. Could you tell us what is
23 hummocky terrain and why it is important to recognize
24 this type of terrain when trying to minimize terrain
25 damage?

26 A Hummocky terrain is an
27 area characterized by small frost-heave earth hummocks.
28 The surface of hummocky terrain is very uneven, as
29 the small mounds are usually one to two feet high,
30 separated by what we call interhummock troughs.

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1 Hummocky terrain is underlain by permafrost, except
2 in the southern part of the Mackenzie Basin where
3 fossil hummocks may be found. Earth hummocks always
4 develop in fine-grained soils which are most susceptible
5 to frost heave. In the natural state there is a thick,
6 up to 3 feet, layer of very ice-rich material immediately
7 below the permafrost table.

8 Q What recommendations
9 would you make with respect to hummocky terrain?

10 A On hummocky terrain no
11 bulldozing, ditching or scalping of the surface should
12 be allowed. Minor disturbance of the organic mat must
13 be avoided to prevent thermal erosion.

14 I am aware of the applicant's
15 proposed method to reduce disturbance through the use
16 of winter construction. In my opinion, the fact of
17 winter construction by itself does not guarantee freedom
18 from disturbance of the hummocky terrain. The uneven
19 surface will result in uneven packing of snow on snow
20 roads, unless particular care is taken to ensure pack-
21 ing even between hummocks. Grading of the snow roads
22 may result in scalping of the tops of hummocks unless the
23 minimum allowable thickness of snow is measured from
24 the tops of the hummocks. The harvesting of snow
25 from hummocky terrain would be hazardous, as scalping
26 of the hummocks on such uneven terrain is almost certain.

27 In regards to the applicant's
28 proposal to use snow roads, I believe that there may be
29 no problems if the work is done as proposed. However,
30 there should be terms and conditions to ensure that

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1 there is no traffic off the snow roads. In addition,
2 harvesting of snow should not be allowed in hummocky
3 terrain and should be strictly controlled on other
4 types of terrain. This may pose a problem in areas of
5 low snowfall, such as on the area along the Arctic Ocean
6 in Northern Yukon where only limited water supplies are
7 available for artificial snow-making.

8 The surface and near surface
9 permafrost in hummocky terrain is subject to excessive
10 frost heaving. Any poles, piles or anchors on hummocky
11 terrain should rest securely in permafrost. Burying these
12 structures only in the near surface layer would allow
13 serious upheaving with resultant destruction. In
14 general, the active layer and the top three feet of
15 the permafrost show signs of intense cryoturbation,
16 "cryoturbation" being a technical term for churning by
17 frost action. The structures should be buried well
18 below the top six feet of the surface.

19 Q On the basis of your
20 terrain studies, what kinds of areas do you recommend
21 should be avoided in route selection?

22 A As a result of my research
23 I recommend that two general kinds of terrain conditions
24 be avoided. If this is not possible, be treated with
25 special care. These are

26 (1) the areas that are highly susceptible to terrain
27 and surface damage as outlined on page 42, Report 73-4,
28 and mapped on the maps of open file E.S.P.-102.

29 (2) the areas of high ground water activity.

30 Q Do you think that these

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1 potentially hazardous areas have been avoided by the
2 present alignments proposed by Canadian Arctic Gas
3 and Foothills?

4 A I believe that many
5 potentially difficult locations were avoided by route
6 selection, I also think that some potentially hazardous
7 areas will be crossed by the proposed route. Many
8 such areas were identified by various studies but
9 no co-ordinated effort was made of examining these
10 areas. By way of examples, a few areas where terrain
11 hazard exist are listed below. I would recommend that
12 further study and evaluation be made of such areas.
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1 Examples are: the area between the Richardson Moun-
2 tains and the Mackenzie Delta. This was at Milepost
3 308 to 400 of the prime route which now has changed --

4 Q Excuse
5 me, is that 308 or 380?

6 A I am sorry, it is
7 380, 380. The route is crossing coalescing alluvial
8 fans having fine sand and silt materials with
9 excess ice. Hazard exists because of excess
10 ground ice; shifting runoff channels; erodible soil;
11 long slope with sheet and channeled runoff.

12 A further example is the
13 area on the western flank of Franklin Mountains, north
14 of Willowlake River. Now, this is an area of
15 major groundwater activity with numerous springs and
16 seepages. Hazard exists because of freezing of
17 groundwater which could cause severe icing.

18 Another example: the area
19 on the eastern flank of Richardson Mountains. This
20 is Milepost 450 to 470 on the Interior Alternate
21 Route. This is an area with scattered subsurface ice
22 lenses. Hazard exists because of the combination
23 of excess ground ice, silty soil, and steep slopes
24 which makes this area prone to retrogressive thaw
25 flow-slide development.

26 A further example is the
27 area on the Yukon Coastal Plain, Milepost 195 to 290,
28 approximately. This is an area of major groundwater
29 activity with numerous springs and seepages, and with
30 scattered subsurface ice lenses. Hazards exists

1 because of excess ground ice; freezing of groundwater
 2 due to refrigerated pipe; channeled and unchanneled
 3 runoff; actively shifting river channels.

4 Q Mr. Zoltai, what are
 5 your views on the width of the right-of-way in rela-
 6 tion to terrain damage?

7 A All trees and high
 8 shrubs will be cut from the right-of-way, according
 9 to the proposal. Even without any damage to the
 10 ground surface, this will alter the vegetation
 11 on the right-of-way by the eventual eradication of the
 12 feather mosses which possess good insulating qualities.
 13 The active layer will increase, and some water will be
 14 released. Thermal subsidence is a distinct possibility.
 15 It is my view that any reduction in the width of the
 16 right-of-way on ice-rich materials would be beneficial
 17 as this would reduce the possibility of terrain damage.

18 I am aware from Section
 19 13.a.6 of the Canadian Arctic Gas application, why a
 20 120-foot right-of-way has been requested. Although a
 21 wide right-of-way has obvious advantages for ease of
 22 construction, in areas of potential problems, in my
 23 opinion there should be attempts to narrow the
 24 right-of-way. Due to restrictive legislation, sections
 25 of the Alyeska pipeline are being constructed on a
 26 55-foot right-of-way. This imposes restrictions on the
 27 movements of vehicles and materials, but it also
 28 illustrates that construction is possible on much less
 29 than a 120-foot right-of-way. In my opinion there
 30 should be terms and conditions to restrict the right-

Zoltai, Peterson
In Chief

1 of-way on sensitive permafrost areas by providing
2 a passing lane at regular intervals, instead of a
3 passing lane along the entire length of the route.

4 Q In the vicinity of the
5 Ebbutt Hills the proposed Arctic Gas pipeline would
6 cross these hills, while the proposed Foothills
7 pipeline would go around them to the west. Would you
8 describe the terrain encountered in this region
9 by the two different routes?

10 A The Gas Arctic alignment
11 deviates from the Foothills alignment southward of the
12 crossing of River Between Two Mountains. After crossing
13 a bedrock ridgs, the alignment, that is, Gas Arctic's
14 alignment, traverses a drumlinized till plain of low
15 potential sensitivity. After crossing the Willowlake
16 River, the route begins to ascend to the Ebbutt Hills.
17 For the most part the proposed route is on hummocky
18 terrain with high ice content near the surface. This
19 feature, in combination with the long slope gives
20 this area a higher rating for potential terrain
21 sensitivity than any area south of Wrigley. After cross-
22 ing some peatlands with discontinuous permafrost at
23 the summit of the Hill, the route descends steeply.
24 The route then crosses very large fens and peatland with
25 discontinuous permafrost.

26 The Foothills route follows
27 the Mackenzie River Valley more closely. It crosses an
28 area of high groundwater activity just north of the
29 Willowlake River. South of here the route is in a
30 till plain, mainly on the flanks of the Ebbutt Hills,

Zoltai, Peterson
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1 in terrain with only sporadic permafrost. The area is
2 not rated as sensitive to disturbance. Further
3 south the route crosses extensive fenlands both
4 north and south of the Mackenzie River.

5 The Gas Arctic route avoids
6 the area of high groundwater activity north of the Will-
7 lowlake River crossing. At the northern approaches of
8 the Ebbutt Hills it crosses potentially sensitive areas
9 where both thermal erosion and hydrostatic erosion will
10 present hazards. The descent from the Ebbutt Hills is
11 very steep, with the attendant erosion problems.
12 Southeast of Trail River extensive unfrozen fens and
13 discontinuously frozen peatlands will cause problems.

14 The Foothills line, while
15 crossing generally non-sensitive terrain, would
16 traverse an area of high groundwater activity north of
17 Willowlake River and would intercept the drainage on the
18 western flanks of Ebbutt Hills. The extensive un-
19 frozen fens and discontinuously frozen peatlands south-
20 east of Ebbutt Hills may cause problems.

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Zoltai & Peterson
In Chief

1 From a terrain point of
2 view, the best route would be the amended Gas Arctic
3 alignment to the Willowlake River crossing, and then
4 curving to the west to avoid the flanks of the Ebbutt
5 Hills. The crossing of the Mackenzie River upstream of
6 Fort Simpson as proposed by both companies is preferred
7 over a downstream crossing.

8 Q If this proposed pipeline
9 to be
10 were constructed, what special concerns would arise
11 with regard to fire, and what recommendations would
12 you make in this regard?

13 A The active layer would
14 increase to nearly twice its normal thickness within
15 five years of a fire. Large amounts of water would be
16 released as the near-surface permafrost thaws, causing
17 subsidence and on moderately to steeply sloping terrain,
18 considerable soil movements. The process of re-establish-
19 ing the natural vegetation and insulation of the surface
20 is slow; it takes 80 to 100 years before conditions will
21 be similar to those before the fire.

22 The construction scheduling
23 proposed by the applicant shows that considerable
24 activity, such as surveying, stockpiling, construction
25 of support facilities and so on, will occur in the
26 summer. This means an influx of people, hence an in-
27 crease in the possibility of accidental fires. Even in
28 the winter fires may smoulder under snow cover to erupt
29 later. If ill-prepared for the increased probability of
30 fires, such activities as equipment deployment in
summer over thawed surfaces, fireguard construction,

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In Chief

1 delay in effective control, etc. will cause additional
2 damage.

3 The applicant should be
4 required to initiate a contingency plan of fire preven-
5 tion, detection and control, in order to cope with the
6 increased probability of forest fires.

7 Q The Northern Yukon was an
8 area which you studied in some detail. From a terrain
9 point of view, which of the prime route or the interior
10 route do you think is preferable?

11 A From a strictly terrain
12 point of view, the interior route appears to be preferab-
13 le. The prime route crosses some ice-rich terrain from
14 the Alaska border to the Willow River crossing. It then
15 crosses a series of active alluvial fans, until the
16 alignment turns eastward to the Mackenzie River. This
17 route would -- I must add that I wasn't aware that the
18 new prime route is now the cross-delta route when I
19 wrote this piece, for which I apologize -- this route
20 would cross numerous high energy streams, many with
21 extensive aufeis formation

22 The sensitivity of terrain
23 to damage along the interior route is far lower. Diffi-
24 cult sections would be encountered in the Richardson
25 Mountains, and along the ice-rich foothills of the
26 Richardson Mountains.

27 Q According to the Phase 2
28 evidence of Arctic Gas, the broad objectives of their
29 revegetation program are:

30 (1) to promote soil stability, and

Zoltai & Peterson
In Chief

1 (2) encourage the re-establishment of natural plant
2 communities.

3 In your opinion, are these
4 objectives met by the proposed construction methods?

5 A The revegetation
6 program augmented by erosion control measures, may be
7 effective in checking erosion by running water. Revege-
8 tation by grasses, however, will be far less effective
9 in checking thermal erosion on disturbed areas which
10 are unaffected by the permafrost bulb generated by
11 the refrigerated gas pipe.

12 The best insulation is
13 provided by some natural plant communities, namely those
14 which grow under coniferous trees and are dominated
15 by mosses and lichens. Unless these plant communities
16 are allowed to establish themselves on the right-of-
17 way, the thermal quality of the vegetation will be
18 lower than optimum in reducing thermal erosion. This
19 process would take many years to become effective.

20 My own observations have shown
21 that it is the organic mat and not the green tops that
22 insulate the surface. Agronomic species and native
23 species that invade a disturbed area have low insulating
24 qualities. In my opinion, any revegetation program by
25 itself, whether with agronomic or native species,
26 will not prevent thermal erosion in the short term.
27 The only way to rapidly re-establish a negative heat
28 balance is to supplement the revegetation program with
29 artificial insulative materials.

30 Now the subject of insulative

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In Chief

1 supplement for revegetation programs is incompletely
2 known. The artificial insulative material should be
3 bio-degradable, such as peat, shredded wood, sawdust, st
4 and so on, possibly covered thinly by soil to permit
5 the germination of sown seeds. I feel that much experi-
6 mentation is necessary to devise a revegetation program
7 that is effective in checking erosion by running water
8 and by thermal degradation both in the short and the
9 long term.

10 Q Would you indicate what
11 further research, in your opinion, is needed to effect-
12 ively limit terrain damage?

13 A On the basis of the appli-
14 cant's research and also the evidence presented before
15 this Inquiry, I think that the inter-action between
16 ground water and chilled pipeline needs to be investiga
17 ted more thoroughly. The presently available data are
18 sufficient to make accurate predictions on the behaviour
19 of ground water near a chilled pipeline.

20 The prevention of artificial
21 palsa formation in wet fens must be demonstrated
22 experimentally, preferably by field experiment.

23 The insulating qualities of
24 various native and introduced plant communities are
25 incompletely known. Most of our knowledge is derived
26 from observations of consequences of uncontrolled dis-
27 turbances. A revegetation program that would be effec-
28 tive in controlling both thermal and hydrologic erosion
29 would need to be developed.
30

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In Chief

1 In my opinion, the answers
2 to the above problems are not available from the literature.
3 A research program dealing with these problems should
4 be initiated, but reliable answers may not be found
5 for several years.

6 MR. ANTHONY: Thank you, Mr.
7 Zoltai.

8 Mr. Commissioner, while both
9 Dr. Peterson and Mr. Zoltai dealt with somewhat different
10 problems, I presented them together because I understand
11 that certain counsel wish to cross-examine one and then
12 the other, so I think the best course of action is to
13 allow both of them to be available for cross-examination
14 as counsel wish.

15 MR. MARSHALL; Sir, I checked
16 with some of the counsel. I missed John Bayly but his
17 advisor was there, and asked if I might be allowed
18 to start the cross-examination of Mr. Zoltai. I under-
19 stand Mr. Scott wants to follow with his cross-
20 examination of Mr. Zoltai as well.

21 THE COMMISSIONER : All right.
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Zoltai, Peterson,
Cross-Exam by Marshall

1 CROSS-EXAMINATION BY MR. MARSHALL:

2 Q Mr. Zoltai at page 10
3 of your evidence you state:

4 "In my opinion any revegetation program
5 by itself whether with agronomic or native
6 species will not prevent thermal erosion
7 in the short term. The only to rapidly
8 re-establish a negative heat balance is to
9 supplement the revegetation program with
10 artificial insulative materials. "

11 Sir, I was wondering in what areas you would recommend
12 the use of such artificial insulative materials?

13 A I am referring to
14 areas which are outside the inference of the
15 frost bulb generated by the pipe itself in areas which
16 have been disturbed by construction.

17 Q Would it also be your
18 position that such artificial insulative materials
19 would only be required in areas that would be very
20 sensitive? I am thinking, for example, of ice-rich
21 slopes, say, of more than 3°.

22 A Yes, this is true. I
23 would think that such extreme cautions are not
24 necessary on non-permafrost soils or soils which are
25 not underlain by icy materials.

26 Q I see. Would you agree
27 with me, sir, that in some of these locations, such
28 as, for example, ice-rich slopes of more than
29 3° there are other mitigative measures that might
30 be employed and I am suggesting for example that

1 there could be drainage measures taken to release
2 pore pressures in slopes?

3 A Yes, this would help
4 the erosion by running water, help to check it,
5 that is.

6 Q This would also
7 help in areas of potential slope instability, would it
8 not? The installation of such measures?

9 A It may, but it probably
10 will not influence greatly the erosion by thermal
11 degradation. In other words, it may check some of
12 the slope movements.

13 Q Sir, in response to
14 question 9 of the prepared evidence you expressed the
15 concern that icing development in fens would further
16 jeopardize the safety of the pipeline. In response
17 to question 9, page four; and similarly in your
18 response to question 16, which would be on page 7,
19 you identify the area on the western flank of the
20 Franklin Mountains as a potentially hazardous area
21 because of the occurrence of spring seepages. You
22 state that the hazard exists because of freezing
23 groundwater which could cause severe icings.

24 Sir, I wonder if you
25 could -- have I understood you correctly? Is that
26 a correct summation of your concerns?

27 A One concern refers
28 to permafrost formation and restriction of drainage
29 by the ice dam.

30 Q Yes, I want to get to

Zoltai, Peterson
Cross-exam by Mar...l

1 that point later--

2 A Okay, the second one is
3 an area of high groundwater activity where freezing
4 may be induced by the buried pipeline.

5 Q I understood your
6 evidence to suggest that there might be problems
7 with icings created either in fen areas because of
8 the presence of the chilled line, or in areas of
9 high groundwater activity such as in the western
10 Franklins --

11 A Yes, --

12 Q It is a matter of
13 icings development that I want to deal with .

14 A Right.

15 Q Now, I was wondering,
16 sir, if you could tell us in your opinion what
17 specifically are the hazards that pose a threat to
18 pipeline integrity that are associated with icings?

19 A Well, I can think
20 of two major, two principal ways of damage, one
21 being the presence of a large body of ice, either
22 on the surface or in the subsurface area which
23 may alter the drainage pattern of that particular
24 area. In other words, if you have a large tabular
25 piece of ice on the surface it may deflect the spring
26 runoff and deflect it in such a way that it would
27 cause serious erosion problems.

28 Q Well, just if I can
29 stop you before you go on to the next one, sir. On
30 that, if there were an icing would runoff not be more

Zoltai, Peterson
Cross-Exam by Marshall

1 likely to melt the icing than frozen soil in a frost
2 bulb around the pipe?

3 A I am visualizing
4 an icing situation where you have -- perhaps several
5 feet of ice sitting on top of the ground, and this
6 would create a high area so that the runoff would
7 flow around it rather than through it.

8 Q Yes.

9 A This is the model
10 I am visualizing.

11 Q And what do you feel
12 would happen by the diversion of runoff around this
13 icing?

14 A Well, you are concentrat
15 ^{on}ing/therunoff,for one thing --

16 Q Yes.

17 A --perhaps around the
18 icing, and any concentration of running water out-
19 side its natural course will very likly cause erosion.

20 Q Well, my point was,
21 wouldn't the erosion be more likely to occur at the
22 icing itself. That is, wouldn't the running water
23 erode the icing, rather than erode frozen soil around
24 a pipeline?

25 A Well, it will erode
26 soil around the icing and then eventually, perhaps, it
27 will cross the icing itself and erode it too, helping
28 to melt.

29 Q I think the point that
30 I was trying to make was that wouldn't you agree that

1 ice would be more easily eroded than frozen soil?

2 A I assume this is the
3 case, yes.

4 Q Now, sir, in your
5 reply to Question 22 the statement was made that "the
6 interaction between groundwater and the chilled
7 pipeline needs to be investigated more thoroughly, and
8 that available data are not sufficient to accurately
9 predict groundwater behaviour near a chilled
10 pipeline." I was wondering, sir, if you could be
11 more specific with regard to what aspects require
12 further investigation?

13 A Well, I am not a
14 geophysicist, but I am aware in general terms of
15 the debate that had gone on before this Inquiry and
16 from this, by different, having presented different
17 views by well-known experts, I can see that there
18 is still a debate going on, still disagreement going
19 on and this is the only point that I am trying to
20 make here.

21 Q I see. Do I gather
22 then that it is not an area in which you feel that
23 you have expertise, but you are just commenting
24 on the fact that this is a matter that has been
25 discussed by various experts before the Inquiry?

26 A I am marginally interested
27 here because having seen the causes of ice accumulation
28 and therefore I am hoping that some solution will
29 be found in this direction.

30 Q I was wondering, sir,

1 whether your interest has led you to examine the
2 Batelle report entitled "A Convective Model for
3 Subsurface Flow Around a Chilled Pipeline", dated
4 October 31, 1974? It has been in evidence before
5 the Inquiry.

6 A I know of the instal-
7 lation, but I have not seen it.

8 Q I see. Sir, the
9 next area that I wanted to ask you about relates
10 to some comments in response to Question 14, about
11 water availability on the North Slope. I realize,
12 sir, that you were probably preparing your testimony
13 when this matter was under very considerable dis-
14 cussion here in Yellowknife, and I wondered whether
15 or not you were familiar with the evidence that
16 had been given by the Phase II panel called by
17 Arctic Gas that dealt with the impact on the physical
18 environment and the cross-examination of that panel?
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Zoltai & Peterson
Cross-Exam by Marshall

1 A No, I am not aware of
2 that.

3 Q The reason I mention it is
4 that Dr. McCart was cross-examined at some length with
5 respect to water availability studies he'd conducted on
6 the North Slope, sir, and he made specific reference
7 to certain -- to a particularly large spring near the
8 Firth River which had a very high flow, and which he
9 felt could satisfy all the requirements for spread
10 "C" on the North Slope in the third winter with a
11 mere 1.4 days of flow. Would you be aware of the
12 existence of such a spring?

13 A I know of an area of high
14 groundwater activity in the area, but I have no idea
15 of the volumes involved.

16 Q I see.

17 MR. SCOTT: For the record, I
18 demur to that summary of evidence. I'm not quite sure
19 that's what Dr. McCart said, but perhaps we'd leave
20 it there.

21 MR. MARSHALL: I think that's
22 a fair summary. Dr. Clark has the calculations here
23 and I can file those if you like, Mr. Scott, if you
24 think it would --

25 MR. SCOTT: The only point I
26 made was that Dr. McCart gave evidence about the spring
27 and his views about its flow. I don't think he purported
28 to say that that would be adequate for Arctic Gas'
29 needs. He told us something about the spring and its
30 volumes, but that was as far as he went, as I recall.

Zoltai & Peterson
Cross-Exam by Marshall

1 But the record surely will speak for itself in that
2 regard.

3 MR. MARSHALL: I agree, he
4 was giving it as an indication of the volumes that are
5 available and he cited this as an example. To put it
6 in some sort of perspective, he said, "Taking this
7 one spring, that's what's available."

8 Q Sir, the next area of
9 interest to me relates to your comments on construction
10 in fens. Now you've commented in question 10 that the
11 applicant will be unable to place a load over the
12 frost bulb in order to compress frost heaving in fens.
13 Now do I correctly understand your --

14 A Unless, of course, it's
15 attached to the pipe.

16 Q You're suggesting that
17 the only way to do it would be through concrete weights.

18 A Well, I'm no engineer
19 and I'm no geophysicist, but I really cannot visualize
20 any other possibility. There may be others.

21 Q Sir, do you regard fenlands
22 to be essentially the same as muskeg areas?

23 A No.

24 Q You don't. I understand
25 that in engineering terms they regard the characteristics
26 of fenlands, which are ^{composed of} essentially peat, to be
27 essentially the same as muskeg areas. You don't look at
28 it that way?

29 A There's quite a debate
30 going on in terminology, and to me muskeg is an overall

Zoltai & Peterson
Cross-Exam by Marshall

1 term of any kind of wet area regardless whether it's
2 frozen, unfrozen, with trees, without trees or any-
3 thing of this sort.

4 Q You have a more restric-
5 tive definition of "fenlands"?

6 A Yes, we do.

7 Q I think specifically our
8 interest relates to the engineering properties of the
9 materials that would be in a fen or in a muskeg. I
10 was wondering whether or not you would consider that
11 the engineering characteristics would be different.

12 A In a fen as opposed to
13 a muskeg?

14 Q Yes.

15 A It depends what kind of
16 a muskeg it is. Probably, I think the engineers have
17 a rating, I think it's an FI on the Radforth
18 scale which would probably be our fen.

19 Q I'm advised that we think
20 we're together on this point, so I'll carry on, Mr.
21 Zoltai. You'll tell me if I'm getting off-track. Now,
22 sir, I was wondering whether or not you were aware of
23 the types of loading that Arctic Gas proposes to use
24 to inhibit frost heave?

25 A No, I am only aware of
26 the information given in the application.

27 Q Well, there's been evidence
28 given before the Inquiry, for example, that there would
29 be loading of from three to five feet high and over an
30 area of approximately 40 feet wide of a berm used to

Zoltai & Peterson
Cross-Exam by Marshall

1 control frost heaving, and what I'm suggesting, sir,
2 is that this type of loading would in effect be
3 similar to that that would be presented by a smaller
4 secondary road. Would you agree with that?

5 A I have no idea. I do
6 visualize difficulties in maintaining that load on top
7 of a fen.

8 Q Well, as I understand
9 it, sir, there is very considerable engineering
10 experience with construction of roads and railroads and
11 dams and dykes over muskeg, and an engineering
12 resolution of the problem is fairly well understood.

13 A I agree.

14 Q Do you not think that
15 that engineering data is transferrable to fens?

16 A As far as road construc-
17 tion is concerned, probably it is.

18 Q It would follow then that
19 you would be able to maintain a road over an area of
20 fens. You could maintain the roadway.

21 A I would think so. I
22 think it has been done.

23 Q Yes sir. Well, if one could
24 maintain a roadway I am suggesting to you that one could
25 maintain a berm that would be used to provide the sur-
26 charge to control frost heave in a fenland as well.

27 A Well, this where my lack
28 of knowledge of geophysics comes to fore. You see, I
29 really don't know just how the pressure is transmitted
30 through the fen to the peat or to the pipe. I really

Zoltai & Peterson
~~CROSS~~-Exam by Marshall

1 couldn't comment on that.

2 Q Mr. Zoltai, in your
3 response to question 9 you offered the opinion that
4 stresses induced during freezing in fenlands could
5 easily damage pipe. Now sir, I suggest to you that
6 in order to be able to make that sort of a determination
7 one must have considerable information. One aspect would
8 be pipe-soil inter-action data, and another would be
9 a detailed understanding of mechanical stress analyses
10 in conjunction with expected rates of heaving.

11 A I agree with you.

12 Q And I'm sure you'd agree
13 as well that that's a subject that's outside your area
14 of expertise.

15 A Absolutely.

16 Q It would follow then that
17 you would not really be able to say that damage could
18 easily occur.

19 A All I can say that I have
20 seen the forces of palsa formation in the natural state
21 and yes, it just takes a little bit of imagination to
22 see what would happen if you place a pipe in there,
23 whether a pipe could withstand it or not I really am
24 in no position to say.

25 Q Well, I suggest, sir, that
26 that's the whole point. One has to understand what a
27 large diameter heavy-walled steel pipe can withstand
28 before one can make that sort of statement that damage
29 could easily occur.

30 MR. ANTHONY: I'm sorry, so I



Zoltai & Peterson
Cross-Exam by Marshall

1 understand the question myself, I gather from what
2 Mr. Marshall is stating, that an understanding of the
3 remedial techniques and their success is an important
4 consideration before this observation can be made. I
5 think what the witness has indicated is that on the
6 basis of the observation of the terrain situation,
7 this is the situation that could possibly damage a
8 pipeline, and I think what has been established is
9 that whether or not the remedial techniques will work
10 and whether this will prevent this natural state from
11 existing is an area beyond Mr. Zoltai's area of
12 expertise. He's merely indicating that this is a
13 problem that he hopes -- that he isn't satisfied at
14 this stage the geotechnicians have assessed.

15 THE COMMISSIONER: Mr. Zoltai
16 has explained that he understands or at least knows
17 the extent of the pulling forces that would be at work,
18 the stress on the pipe, the capacity of the pipe to
19 withstand the stress, well that's understood. He's
20 talking about the phenomenon that occurs, what impact
21 it will have on the pipe is something we've dealt
22 with before and may again.

23 MR. MARSHALL: Q Sir, I'd like
24 to deal with some comments of yours pertaining to
25 thermokarst development. In your responses to
26 questions 5 and 6, you state that it is important to
27 prevent ponding, mainly to prevent thermokarst
28 development which could ultimately threaten the inte-
29 grity of the pipe. I was wondering, sir, if you
30 have established from field measurements, characteristic

Zoltai & Peterson
Cross-Exam by Marshall

1 rates of thermokarst development associated with
2 induced ponding?

3 A Not with induced ponding,
4 no.

5 Q Further, sir, have you
6 observed rapid and progressive thermokarst development
7 into undisturbed areas, for example, associated with
8 ponding and seismic lines?

9 A I have seen examples, yes.

10 Q Do you have any informa-
11 tion that you could give us, sir, as to the rate of
12 development of the thermokarst in these areas?

13 A I'd have to quote this
14 from memory, but I hope I'll be reasonably accurate.

15 Q Well, perhaps if you have
16 it in written materials and you feel more comfortable --

17 A I have it in my notes.
18 It relates to particular seismic lines where we can
19 date the actual construction of a seismic line and I
20 can tell you from my notes just how far the thermokarst
21 has developed.

22 Q It would be useful if you
23 could provide that information, when you've had an
24 opportunity to consult your notes.

25 A Yes.

26 MR. MARSHALL: If you might
27 do that through Mr. Anthony I'd appreciate it.

28 MR. ANTHONY: All right.
29
30

1 Q In response to Question
2 6 you make the general recommendation that no
3 structure be allowed to disrupt the natural drainage
4 and cause prolonged ponding, but do not qualify
5 this recommendation as pertaining to only ice-
6 rich materials. Would you accept such a qualificat

7 A In order to prevent
8 thermokarst development, yes.

9 Q Sir, my next questions
10 relate to your comments on interruption of drainage
11 in fens and the resultant dessication.

12 In response to Question
13 number four, item four, you make the statement that
14 frost heaving will cause a dam across fen lands and
15 cause ponding upstream and dessication downstream.
16 Now, sir, I understand dessication to/ ^{mean} drying up.
17 Do you mean that literally, or do you mean something
18 else?

19 A Dessication in this
20 case means that it will receive less water than it
21 has before.

22 Q You are not suggesting
23 that the area downstream of the pipeline would
24 dry up?

25 A It won't be bone
26 dry, that is for sure.

27 Q Perhaps we could
28 discuss this a bit, see if I understand it correctly
29 The fen is there, I understand it, because down-
30 stream of the fen area, or downslope of it, there

Zoltai, Peterson
Cross-Exam by Marshall

1 some sort of an impermeable barrier that allows
2 water to accumulate in the fen, is that correct?

3 A Yes.

4 Q And I take it that
5 for purposes of our discussion, could we consider
6 a fen to be somewhat of a depression that is filled
7 with material and water to the surface?

8 A Okay.

9 Q And there is then an
10 impermeable barrier downslope, at the end of the
11 fen, and that is what allows for the accumulation
12 of water in the fen?

13 A Right.

14 Q And would I be correct
15 in saying that you would have, say, eight to ten
16 feet of peat in the fen, and that would be underlain
17 by relatively impermeable soil?

18 A Quite likely.

19 Q And that would be
20 necessary, would it not, because if the soil underneath
21 were permeable, the water would drain through it and
22 you wouldn't have a fen?

23 A Yes.

24 Q Now, sir, the concern
25 that you were expressing related to a fen such as
26 we have discussed with a pipeline, a buried chilled
27 pipeline running through a part of it, and the concern
28 about cutting off water downslope of the
29 pipeline --

30 A Right.

Zoltai, Peterson
Cross-Exam by Marshall

1 Q You would agree with
2 me that the barrier at the downslope end of the
3 fen would remain and accordingly there would still be
4 some ponding of water upstream of that barrier?

5 A Right.

6 Q As well, the pipeline
7 would have mound breaks in it --

8 A Right.

9 Q -- as discussed by the
10 applicant.

11 A Right.

12 Q And these would allow
13 surface water and groundwater to pass through the
14 mound breaks to the area downstream of the pipeline?

15 A Yes, there would be
16 some water going through it, yes.

17 Q And the water could
18 also accumulate in the fen that had fallen directly
19 on the fen?

20 A Oh, yes.

21 Q And it could come in
22 from the other sides?

23 A Right.

24 Q Would you agree with me,
25 sir, that properly designed, located and maintained
26 mound breaks would minimize ponding and would handle
27 drainage across the pipeline? It would allow for
28 drainage to go across the pipeline?

29 A If they are properly
30 spaced, yes.

1 Q Yes, and I see that you
2 have some suggestions in your evidence as to what
3 requirements there would be for mound breaks?

4 A In this case, I really
5 don't know because I don't know what would happen
6 to a mound over a fen. I don't know whether it is
7 going to be a natural mound, a planned mound or a mound
8 that was pushed up by the frozen ice.

9 Q I see. Now, sir, in
10 a sense I think we have been discussing a worse
11 case situation, and that is with a pipeline running
12 right across a fen, and you would agree that in
13 many cases it would cross obliquely and have less
14 effect on the downslope part of the fen?

15 A Probably an oblique
16 crossing would have the same effect as a right
17 angle crossing.

18 Q I guess it depends on
19 the area downslope --

20 A -- and the shape of the
21 fen itself.

22 Q Now, sir, we have
23 been discussing fens at some length and I appreciate
24 that you are a recognized expert in this area, and I
25 wondered if you had analysed the Arctic Gas line
26 to determine the number of miles of fens that the
27 pipeline itself would pass through. Now, I am not
28 interested in the number of miles of fenlands in the
29 area, but the number of miles of fens that the line
30 itself would be going through.

Zoltai, Peterson
Cross-Exam by Marshall

1 A I didn't analyse the
2 entire route of the proposed pipeline, but I did look
3 at sections of the pipeline, two sections to be
4 correct. Milepost 260 to 300, it is a 40-mile section
5 in the Fort Good Hope area, this is on Section 1B
6 of the alignment, and I used your own terrain
7 classification as presented on the alignment sheet,
8 and according to this the peatlands crossed by the
9 pipeline is 6.75 miles which is about 16.9% of the
10 40-miles stretch.

11 Now, in this particular
12 area, based on my own experience in the area, this
13 would mean that about 1/3 of the peatlands would be
14 unfrozen fenland. So this would make it about 2.25
15 miles of fenland within this 40-mile stretch.

16 Now, I also looked at another
17 section of the area, of the proposed alignment, the
18 amended alignment, 1M, just north of the Mackenzie
19 River crossing, between Milepost 640 and 680 and
20 here again I used the terrain mapping presented on the
21 alignment sheet and I found that the peatland
22 types which is the PT the SM and SB's in this 40-mile
23 stretch, add up to 14.5 miles of that stretch.

24 Now, again based on my
25 own knowledge of the area, I would say that perhaps
26 2/3 of this would be in the unfrozen peatlands or
27 fenlands. In addition, in this same area, according
28 to the typing, there are areas where the peatland
29 is secondary and this would make up about ten or
30 twelve miles. Now, because they are secondary, I am

Zoltai, Peterson
Cross-Exam by Marshall

1 assuming that it is not all peatland, of course, but
2 I am assuming about five miles of this would be
3 peatland. So altogether then, it is a very, very
4 crude approximation. I would say that in this
5 40-mile zone there would be 11.9 miles of unfrozen
6 fenlands or about 30% of this section would be an
7 unfrozen fenland.

8 Now, this, I feel, is a
9 conservative estimate because you are using a very
10 broad type of analysis which ignores the smaller
11 fens that could be just as troublesome as the
12 larger ones.

13 Perhaps, Mr. Zoltai,
14 we ought to be providing you with some statistics
15 that Northern Engineering has compiled on this. I
16 see that you have done part of the analysis. N.E.S.
17 has done it a couple of ways. They have done it
18 by alignment sheets, and they have taken off the
19 extent of fens by alignment sheet, give the starting
20 milepost and the length of the fen. We have that
21 information and we will give it to you and we will
22 file it, sir. While we have a table which
23 sets out the extent of fens along the prime route
24 north of 60° in the continuous permafrost zone and
25 the discontinuous permafrost zone, giving the segment
26 length and the number of miles of fens and the
27 percentage of the total route.

28 I should perhaps just
29 point out that the number of miles of fens along the
30 prime route north of 60° in Canada is 19.87 miles

1 or 1.67% of the alignment.

2 MR. ANTHONY: So that
3 I understand what is taking place here. You are
4 suggesting that Northern Engineering Services has
5 its own estimate as to the amount of fenland and that
6 is the information that you wish to put to the
7 witness to get his comments, or is this just going
8 to be filed or is this evidence coming forward -- I
9 am not exactly sure what you expect the witness to
10 do with these figures which you have now provided them.

11 MR. MARSHALL: Well, I would
12 like Mr. Zoltai to indicate whether or not he is in
13 agreement with these estimates. If he doesn't wish
14 to comment on it, that is fine. He has done some
15 calculations on the extent of fens, and that is a
16 considerable part of his evidence. We have this
17 data. It seems to me we should put it to him particul-
18 arly as we may possibly, may want to call rebuttal
19 evidence on this subject.

20 THE COMMISSIONER: Well, I think
21 you should, Mr. Marshall, put it to the witness.

22 MR. BAYLY: Is this a matter
23 that there is a report on that we don't have access
24 to Mr. Commissioner -- we have a chart, but there
25 has been no indication as to how that information
26 was generated and that might be of value to us all.

27 MR. SCOTT: I think, Mr.
28 Commissioner, the applicant filed a deficiency statement
29 reply with the National Energy Board to which is
30 attached a chart, and perhaps that is the easy way

1 to get at it.

2 MR. ANTHONY: Well, is
3 that the information that is coming forward?

4 MR. MARSHALL: Dr. Clark
5 is here with me. He could explain the origin
6 of the materials more accurately than I could, sir.

7 MR. SCOTT: Well, Mr.
8 Commissioner, I have no objection if Dr. Clark explain
9 it to Mr. Marshall, but we are in the middle of the
10 cross-examination of witness,

11 THE COMMISSIONER: Well, I
12 see nothing wrong with Dr. Clark explaining it to
13 the rest of us. What is wrong with that?

14 MR. SCOTT: It is a critical
15 area. If he is going to be cross-examined I have
16 no objection to it.

17 MR. MARSHALL: Well, sir,
18 I can do this any way you like --

19 THE COMMISSIONER: Well, I
20 will tell you, Mr. Marshall, what we are going to
21 do. We are going to stop for coffee. Mr. Scott and
22 you can sort this out.

23 MR. MARSHALL: Fine.

24 THE COMMISSIONER: All right

25

26 (HARASSMENT OF LARGE MAMMALS AND BIRDS, VALERIUS
27 GEIST, SEPTEMBER 1975, MARKED EXHIBIT 359)

28 (PIPELINE NORTH, THE CHALLENGE OF ARCTIC OIL AND GAS,
29 E.S. COMM. 72-1 MARKED EXHIBIT 360

30

1 (MACKENZIE VALLEY - NORTHERN YUKON PIPELINES, SOCIO-
2 ECONOMIC AND ENVIRONMENTAL ASPECTS, 74-17 MARKED
3 EXHIBIT 361)

4 (ECOLOGICAL RESERVES IN CANADA: THE WORK OF IBP-CT,
5 MCLAREN AND PETERSON; NATURE CANADA, VOL. IV:
6 22-32, MARKED EXHIBIT 362)

7 (IBP ECOLOGICAL SITES IN SUBARCTIC CANADA, 1975,
8 MARKED EXHIBIT 363)

9 (ECOLOGICAL SITES IN NORTHERN CANADA, NETTLESHIP
10 AND SMITH, APRIL 1975 MARKED EXHIBIT 364)

11 (CANADA/MAB REPORT, OCTOBER 1, 1975, GUIDELINES FOR
12 THE SELECTION OF BIOSPHERE RESERVES IN CANADA, MARKED
13 EXHIBIT 365)

14 (SOILS AND VEGETATION OF HUMMOCKY TERRAIN, ZOLTAI
15 AND TARNOCAI, APRIL 1974, MARKED EXHIBIT 366)

16 (TERRAIN, VEGETATION AND PERMAFROST RELATIONSHIPS,
17 NORTHERN MACKENZIE VALLEY AND YUKON MARKED EXHIBIT
18 367)

19 (MAP: TERRAIN SENSITIVITY, MACKENZIE VALLEY AND NORTH-
20 ERN YUKON, NORTH PART, MARKED EXHIBIT 368)

21 MAP: TERRAIN SENSITIVITY, MACKENZIE VALLEY AND NORTHERN
22 YUKON, SOUTH PART, MARKED EXHIBIT 369)

23 (WILDLIFE MAPS; UPPER MACKENZIE, MIDDLE MACKENZIE,
24 LOWER MACKENZIE, COASTAL, MACKENZIE DELTA, AND OLD
25 CROW REGIONS, MARKED EXHIBIT 370)

26 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)
27
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29
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1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 MR. ANTHONY: Mr. Commissioner,
3 while we are waiting perhaps I could make one statement
4 the other participants the evidence
4 I have submitted to/the CARC caribou panel, at least
5 the portion of it that will be called before the Christ-
6 mas break, and upon reading it, I think it will be clear
7 that what we have attempted to do in particular on the
8 caribou panel is be responsive to the sort of issues
9 that have been raised, and for that reason we delayed
10 having the statement prepared and distributed until
11 Dr. Lent and Dr. Calef had an opportunity of hearing
12 the evidence and listening to the cross-examination or
13 at least reading portions of it. So for that reason
14 it is somewhat delayed according to your rulings, but
15 we felt that that was perhaps more beneficial to the
16 Inquiry to ensure that it's responsive to the evidence
17 that's been led, rather than merely starting from
18 scratch.

19 We were just
19 THE COMMISSIONER:/ considering
20 motion
20 /to dismiss the application on the ground of want of
21 prosecution.

22 MR. ANTHONY: Mr. Marshall has
23 asked Mr. Zoltai to comment on a calculation of
24 fenland on the route prepared by Northern Engineering
25 Services, and I think Mr. Zoltai has now had an
26 opportunity of discussing the genesis of the information
27 with Dr. Clark, and I believe has some comments on his
28 assessment, or any comments he might have on those
29 figures.

30 WITNESS ZOLTAI: I did have a

Zoltai & Peterson
Cross-Exam by Marshall

1 chance to talk to Dr. Clark about it, but he could
2 not supply me the method of analysis, how this calcula-
3 tion was performed. I'm perfectly willing to assist
4 or not assist, but be involved in an appraisal of this
5 method of calculation, in order to see that we are
6 indeed talking the same language. I can perhaps in
7 a general way comment on these figures.

8 To my knowledge, there are no
9 unfrozen fens in the continuous permafrost zone, so
10 perhaps the first line on that table of zero miles is
11 a quite acceptable figure.

12 MR. ANTHONY: I wonder, Mr.
13 Zoltai, before you proceed, if Mr. Marshall could provide
14 myself with a copy and perhaps the Commissioner so we
15 could follow along with the figures that are being
16 discussed? Perhaps it should also be made as an
17 exhibit to form part of the record.

18 MR. MARSHALL: We have four
19 or five copies here. I'll get some more copies made later
20 today, sir.

21 MR. ANTHONY: So I --

22 THE COMMISSIONER: Before you
23 on, Mr. Zoltai, the mileage of fens on the prime route
24 comes out to 19.87 miles. What was your figure again?

25 A My figure for a randomly
26 selected 80-mile section, or two 40-mile sections was
27 14.0 miles.

28 Q And are you suggesting
29 we multiply that by the number of times 80 that goes
30 into the length of the pipeline?

Zoltai & Peterson
Cross-Exam by Marshall

1 A That's my judgment. Of
2 course I would have to do some comparison of the
3 basis of this assessment, plus my own, but my own
4 general feeling would be that perhaps between 5 to 10%
5 of the prime route south of the continuous permafrost
6 zone would be in fenlands.

7 Q Yes.

8 A So as a rough figure
9 perhaps the percentage as presented here, being 3.10%
10 perhaps should be doubled or a little more than doubled.

11 MR. MARSHALL: I'm just not
12 sure we're talking about exactly the same thing. We're
13 not talking about in fenlands; we're talking about the
14 pipeline itself actually crossing fens.

15 THE COMMISSIONER: Yes.

16 M R. MARSHALL: And I think
17 there's --

18 A That's what I'm talking
19 about, yes.

20 Q Well, sir, I think what
21 I ought to be providing Mr. Anthony with, then is a
22 letter setting out the method upon which the calculations
23 have been made and I'll provide him then with that
24 document you have in front of you, which is Table 1,
25 and Table 2, which is the extent of fens by alignment
26 sheet, and gives him a more complete breakdown. I
27 understand Commission counsel would be interested in
28 these documents as well, and I'll see that it's sent out.

29 MR. SCOTT: Mr. Commissioner,
30 the whole thing can be done perhaps with less formality.

Zoltai & Peterson
Cross-Exam by Marshall

1 Everybody recognizes that Mr. Zoltai is an expert on
2 fens, and if he wants to get in touch, or if Dr. Clark
3 wants to get in touch with him and discuss it with
4 him directly, that's fine.

5 MR. MARSHALL: That's satisfac
6 to us, Mr. Commissioner. I'll provide to Miss Hutchi
7 son copies of Table 1 and Table 2 then, to be entered
8 as exhibits.

9 MR. LUTES: I don't know how
10 that was left. We've got testimony from this witness
11 as to what his calculation of the percentage of fens,
12 and we have Mr. Marshall's tables, and then we have
13 Mr. Scott telling the two of them to get together if
14 they want, to see if they can rationalize the situation.
15 Is that how it was left?

16 MR. SCOTT: That's the way I'm
17 content to leave it. If I could just make one obser-
18 vation before my friend continues. The difficulty with
19 the matter is that the input we have from Arctic Gas
20 is based on their deficiency statement to the National
21 Energy Board, in which they assert that there is 1%
22 thereabouts. As I understand Mr. Zoltai's preliminary
23 work on two sections, it produces a figure that is
24 substantially more than that. Now it's an expert
25 question. Mr. Zoltai, is I think recognized by
26 everybody as the expert in fens, and I'd just like to
27 be sure that he has all the input he needs to analyze
28 that.

29 THE COMMISSIONER: I think,
30 Mr. Lutes, that as I understand it, the real dispute

Zoltai & Peterson
Cross-Exam by Marshall

1 is the extent to which the pipeline crosses fens
2 south of Fort Good Hope in the zone of discontinuous
3 permafrost. They say 3%; Mr. Zoltai says he thinks 6%
4 is more likely to be the accurate figure, and Mr. Scott
5 is saying, "Well, let Mr. Zoltai have the benefit of
6 all of Arctic Gas's work on the subject and see if he
7 budges." Isn't that what we're after?

8 MR. SCOTT: Except that I
9 think he said 5 to 10%.

10 THE COMMISSIONER: Well, and
11 then he said, "Take the 3.10 in the discontinuous zone
12 and maybe it should be doubled." That seemed to be
13 the real focus of the problem.

14 MR. MARSHALL: Well, I take
15 it that what will eventually happen, Mr. Anthony, is
16 that you will advise us whether Mr. Zolti is in agree-
17 ment or disagreement with these two tables that will
18 be entered as exhibits?

19 MR. ANTHONY: I'm prepared to
20 provide any further comments that Mr. Zoltai may have
21 to the Inquiry, and if there is a need to rationalize
22 or if there is in fact a dispute of some substance
23 perhaps Mr. Zoltai could come back and Arctic Gas could
24 call the gentleman who prepared it. It was not Dr. Clark,
25 which is the reason for the confusion. Then perhaps
26 we could let them argue it out before us.

27 THE COMMISSIONER: Do you have
28 any suggestion to make, Mr. Lutes? Is that not satis-
29 factory?

30 MR. LUTES: I was just a bit

1 confused because we are concerned as well with the
2 occurrence of the fens south of Good Hope and unlike
3 Arctic Gas, our line is not chilled in a good portion
4 of that area. I just want to know what this sort of
5 resolution of the dispute that occurs before the
6 break is.

7 THE COMMISSIONER: Oh yes, well
8 we all want to know.

9 MR. MARSHALL: Q Mr. Zoltai,
10 the next question I have relates to the Ebbutt Hills,
11 and I understand you suggested an alignment for a
12 pipeline should be west of the Ebbutt Hills. My informa-
13 tion, sir, is that the Ebbutt Hills are approximately
14 90% frozen, whereas west of the hills where you are
15 suggesting a line ought to be built, there are very
16 extensive unfrozen areas, and you've also mentioned
17 in your evidence groundwater that comes down from the
18 west side of the Ebbutt Hills.

19 A I think I mentioned
20 runoff, rather than ground water.

21 Q Oh, I see, runoff. Well,
22 sir, with a chilled pipeline, would you agree with me
23 that there is a far greater potential for frost heave
24 if the pipeline is west of the hills than if it goes
25 over the hills?

26 A Well, maybe I shouldn't
27 ask the question, but this is to mean that you expect
28 frost heave in unfrozen areas?

29 Q Well, I think that's the
30 evidence that's been before the Inquiry, that the

Zoltai & Peterson
Cross-Exam by Marshall

1 concern with the chilled pipeline is that in areas
2 where it passes through unfrozen terrain there may be
3 frost heave, and the point I'm raising is this, that
4 our information is that the hills themselves are very
5 largely frozen, 90% frozen, and accordingly insofar
6 as the potential for frost heave is concerned, that
7 potential is very much lower than would be the potenti
8 for frost heave in the area west of the hills.

9 A If indeed frost heave can
10 be expected on unfrozen materials, then there's a possi-
11 bility of disturbance or hazard on the western route
12 as well across the Ebbutt Hills.

13 Q Well, sir, have you included
14 the susceptibility of frost heave in your sensitivity
15 of the frost heave in your sensitivity criteria?
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1 A No, I did not. This
2 was strictly the sensitivity of the terrain to
3 damage.

4 Q I see, it wouldn't
5 then specifically be geared to a chilled gas pipeline
6 that is the sensitivity of the terrain given a chilled
7 gas pipeline.

8 A No, it is not.

9 Q Sir, you suggested
10 answer to question 8 that artificial palsas would
11 be created. Now, sir, I would like to take you
12 back to a discussion that we were having a little
13 earlier about fens and my understanding was that
14 you considered that the peat material would be in
15 the upper eight to ten feet, generally --

16 A Right.

17 Q And below that there
18 would be relatively impervious soil, mineral soil.

19 A In my work I find that
20 most palsas are underlain by silt. Now, silt is a
21 particular sized particle which can be quite impervious
22 but it also can permit the migration of water in the
23 unfrozen state.

24 Q And sir, would the
25 silt be underlain by impervious material?

26 A It may be.

27 Q The point that I
28 wanted to discuss with you, sir, was this. It is
29 my understanding that with a pipeline in the ditch,
30 perhaps eight to ten feet below the surface, that the

1 freezing front around the chilled pipeline would
2 very rapidly penetrate into the mineral soil and that
3 there would -- the freezing front would penetrate into
4 the soil and any accumulation of ice lensing would be
5 at the freezing front, that is, in an area that has
6 got very little water content in it and accordingly
7 the likelihood of there being very much heave associ-
8 ated with the advance of that frost bulb is low. Could
9 you comment on that?

10 A I don't think that I
11 can comment on the physics of the accumulation. The
12 only thing that I can add to this is my own observat-
13 in which we find the greatest ice accumulation under
14 a natural fault right at the mineral soil and
15 organic soil interface and a short distance
16 into the silt. Now, what exactly the mechanics are,
17 I really don't know.

18 Q Now, if that interface
19 were eight to ten feet beneath the ground, and that
20 is where the pipe was, the base of the pipe was,
21 the frost bulb, I suggest to you, would very quickly
22 advance beneath that into the mineral soil and you
23 would then have very little accumulation of ice
24 lensing at the freezing front.

25 A No, this does not
26 take place in a natural circumstances because water
27 keeps accumulating, penetrating into the frozen core
28 of the palsa. We do have an accumulation, a migration
29 of water into the frozen core, and hence, ice
30 segregation and heaving.

Zoltai, Peterson
Cross-Exam by Marshall

1 Q Well, I think that that
2 is really our point, sir, that they are quite different
3 processes, the formation of palsas naturally in what
4 is going to go on in association with the advance of
5 the freezing front associated with the frost bulb.

6 A Well, they may be,
7 but I think they should be looked at in some
8 field experiments.

9 Q My last point, sir,
10 that I wish to discuss with you relates to the material
11 on page 9 of your prepared evidence.

12 THE COMMISSIONER: Excuse me,
13 That last point, Mr. Zoltai, your argument being that
14 their experiments were none of them carried out in
15 the zone of discontinuous permafrost?

16 A Yes, especially in
17 very wet fenland.

18 THE COMMISSIONER: Right,
19 where did you say that? You said something -- you
20 referred to Sans Sault, I think, and I am just
21 trying to find where you said that.

22 A I think I only said it
23 in 1971 - '72, we were north of Sans Sault.

24 MR. LUTES: Question two.

25 THE COMMISSIONER: Yes,
26 sorry. Well, anyway, I understand your objection
27 to the -- or at least the point you make about the
28 extent of their experiments.

29 MR. MARSHALL: Perhaps I
30 could just go back over this with you again, sir. As

Zoltai, Peterson
Cross-Exam by Marshall

1 I understand it, palsa formation is related to
2 accumulation of water at a fixed point, really, that
3 is the interface between the peat and the mineral
4 soil?

5 A No one has actually
6 measured just how a palsa grows. We can only recon-
7 struct the events by looking at cores from the
8 palsa and we find that there is a great deal of
9 ice accumulation underneath the palsa. In fact the
10 height of the palsa equals -- pretty well equals the
11 thickness of the ice accumulation underneath it.
12 Now, just where exactly it accumulates, whether
13 it accumulates only at the edge as it freezes or
14 whether water is drawn into it, no one has ever meas-
ured this to my knowledge.

15 Q Is there an indication
16 from your observations and studies that the bulk of
17 accumulation is at that interface between the peat and
18 the mineral soil?

19 A No, there isn't. We
20 have some chemical data which indicates the migration
21 of chemicals from the peat into the palsa and we feel
22 that the carrier of these chemicals would be water,
23 in fact, so it would indicate that water does
24 penetrate into the frozen core and accumulates, so
25 it is not only -- the accumulation of ice does not
26 occur only at the interface, but it is an ongoing
27 process.

28 Q The last point that I
29 wanted to ask you about, sir, was in relation to fires.

Zoltai, Peterson
Cross-Exam by Marshall
Cross-Exam by Carter

1 You mentioned on page nine of your prepared evidence
2 in response to Question 19:

3 "The applicant should be required to
4 initiate a contingency plan of fire preven-
5 tion, detection and control in order to
6 cope with the increased probability of
7 forest fires."

8 I was wondering, Mr. Zoltai, whether or not this had
9 been done in connection with the construction
10 of either the Mackenzie or the Dempster Highways?

11 A I have no knowledge
12 of this.

13 MR. MARSHALL: Those are
14 all my questions, sir.

15 I understand Mr. Scott
16 was intending to go next. Mr. Carter has a couple
17 of questions for Dr. Peterson. I think just
18 two, and perhaps if he could put those we would be
19 finished with this panel.

20 CROSS-EXAMINATION BY MR. CARTER:

21 Q Dr. Peterson, it
22 appears from your evidence that you participated in
23 the preparation of the 1972 Pipeline Guidelines, and
24 I correct in that?

25 A Yes.

26 Q Would you explain what
27 you understand by the corridors referred to in
28 those guidelines?

29 WITNESS PETERSON:

30 A My understanding of
the corridors as referred to in those guidelines

Zoltai, Peterson
Cross-Exam by Carter

1 would be the following geographic area: along the
2 mackenzie Valley from the Arctic coast to the provincial
3 boundary, meaning Alberta provincial boundary, and
4 across the northern part of the Yukon Territory,
5 either adjacent to the Arctic Coast or through
6 the Northern Interior Region from the boundary of
7 Alaska to the general vicinity of Fort McPherson.
8 Those are the words that appear in the guidelines and
9 that is my understanding of what the corridor means.

10 Q And you can't
11 be any more specific than that? In other words,
12 would the corridor extend east of the Franklins,
13 for example?

14 A My understanding at
15 the time was that the corridor would not extend
16 east of the Franklins.

17 Q I see. Now, at the
18 commencement of your testimony Mr. Anthony and Mr.
19 Scott said that you were speaking only for yourself
20 and what you say now, is that -- that is your personal
21 view and you are not necessarily saying that that
22 is the view of the government?

23 A My understanding since
24 1972 until -- has always been that the corridor
25 did not extend east of the Franklins, and I certainly
26 do not read east of the Franklins into the words that
27 I read a minute ago.

28 MR. ANTHONY: Just to make
29 that clear, obviously I would think that Dr. Peterson
30 is not here giving any interpretation or opinion as to

Zoltai, Peterson
Cross-Exam by Carter

1 the legal meaning or the government's meaning of the
2 word, "corridor", and as long as that is understood
3 I think that the answer stands, but I think that that
4 should be made clear.

5 THE COMMISSIONER: Well,
6 that is understood, he is giving us his own opinion
7 about what the corridor was supposed to be as he,
8 Dr. Peterson, understood at the time.

9 MR. CARTER: Now, the
10 next matter that I want to raise with you, sir, is
11 in relation to comments that you made on page 7 of
12 your testimony, and on that page you offer some
13 criticism, if I can call it that, of the interpret-
14 ation that Arctic Gas witnesses put on the guidelines
15 and you offered your own explanation.
16 Again, I take it that that is your interpretation of
17 the guidelines rather than the government's, is
18 that fair to say?

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Zoltai & Peterson

Cross-Exam by Carter

1 A It is my interpretation
2 but I also think it is the government's interpretation
3 because the government's stamp of approval was placed
4 on those guidelines. They were released by the
5 Minister of Indian Affairs, and in those guidelines
6 it was stated that they are not to be construed as
7 substitutes for the requirements of ^{applicable} Acts or ordinances
8 or regulations, so that although it's my interpretation,
9 I also think it was the interpretation of the government.
0 But let me remind you that I'm not here to -- I can't
1 explain government policy, but the words are rather
2 clear.

Q Yes, I understand that the guidelines aren't to replace any existing legislation. I think that perhaps these witnesses consider the guidelines impose certain obligations on themselves as consultants to Arctic Gas, and more specifically to Arctic Gas, and were speaking about how they had gone about complying with them, and you felt that they mis-interpreted them. Am I fair in assessing your evidence in that way?

2 A Yes, I felt that those
3 sentences that I quoted on page 7 of my testimony are a
4 mis-interpretation of the intended purpose of the
5 guidelines.

Q But again you're speaking
for yourself, is that so?

29 A Yes, that's been made
29 clear, I think.

THE COMMISSIONER: When you

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Cross-Exam by Carter

1 say "Arctic Gas and Foothills" mis-interpreted it --

2 A I'm quoting Arctic Gas,
3 I have no comment on Foothills.

4 THE COMMISSIONER:
5 All right, yes, quite
6 so, Arctic Gas.

7 MR.MARSHALL: Sir, I think
8 this is of some importance, particularly since the
9 terms of reference incorporate the guidelines and
10 it's only a suggestion but it might be helpful if
11 Mr. Scott made enquiries to determine what the
12 government's views are on this. We've had evidence of
13 Mr. Peterson's views and it would certainly be helpful
14 to us, and I just leave that with him to consider.

15 THE COMMISSIONER: Well, do you
16 want some more guidelines?

17 (LAUGHTER)

18 MR. SCOTT: Well, Mr. Commissioner
19 I don't intend to do so, at the moment.

20 MR. CARTER: That's all I have,
21 sir.

22 THE COMMISSIONER: I think this
23 is really of historical interest only, but let me ask
24 you anyway.

25 Q You were one of the
26 people who sat down and drew up these guidelines. Is
27 it your view that those guidelines were intended to
28 include a corridor along the North Coast? Is that
29 corridor one that would include the cross-delta route
30 that Arctic Gas now proposes?

31 A I, at the time these

1 guidelines were drafted it never occurred to me that
2 a corridor would extend across the delta. I can
3 add that it never occurred to me that anyone would
4 apply to construct a pipeline across the delta.

THE COMMISSIONER:

5 Yes, I'm sure that's the
6 case. However, I think it's only of historical interest
7 now, unless somebody decides to make something of it.

8 MR. MARSHALL: Sir, I have an
9 exhibit to file with Miss Hutchinson. It's a photograph
10 that relates to the evidence of Mr. Jakimchuk.

11 THE COMMISSIONER: Fine,
12 excellent.

13 (PHOTOGRAPH MARKED EXHIBIT 371)

14 THE COMMISSIONER: Well, Mr.
15 Scott?

16
17 CROSS-EXAMINATION BY MR. SCOTT:

18 Q Dr. Peterson, just one
19 question. My colleague, Mr. Ryder, is going to ask you
20 some questions later but just to follow along what the
21 Commissioner has said. I know that you played a part
22 in drafting the guidelines, and whatever you might have
23 drafted other, than what you drafted might not have been
24 approved by the government, we have to recognize that.
25 But what I'm asking you is this: If it had occurred to
26 you or if Arctic Gas had advised you that they were
27 contemplating building a pipeline or applying to build
28 a pipeline across the Mackenzie Delta, would you as
29 draftsman have included that within the corridor?
30 Now I'm not asking whether the government would have

Zoltai & Peterson
Cross-Exam by Scott

1 approved it, just whether you as draftsman would have
2 put that in.

3 A Yes, I would have, and
4 a few different things would have been added because
5 a delta is, in my opinion, a distinctly different eco-
6 system than the ones we were thinking about.

7 Q And when you say "some
8 different things would have been added" you mean differ-
9 ent potential concerns would have been highlighted?

10 A Yes, I think some geo-
11 morphically distinct concerns would have been mentioned.
12 I'm thinking of things such as the dynamics of channel
13 migration, the presence of storm surges and so on.
14 These did not enter into my thinking when we drafted the
15 1972 guidelines.

16 THE COMMISSIONER: May I just
17 follow that up for a second? I've forgotten your --
18 I shouldn't say "forgotten", but did you make the
19 delta a special field of yours, Dr. Peterson?

20 A No, I did not.

21 Q Oh, so that in developing
22 particular guidelines relating to the delta, arising out
23 of the fact that it's a distinct ecosystem and can't
24 be put on the same basis as the other areas we're
25 concerned with, you would be relying on your -- all the
26 information you received as director of the environmental
27 social program.

28 A Yes.

29 THE COMMISSIONER:
I was just curious as to
30 whether we needed Dr. Peterson in the delta phase, but

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Cross-Exam by Scott

1 I gather he's not essential there.

2 MR. SCOTT: Well, I suppose one
3 of the questions, Mr. Commissioner, that might be raised
4 is that -- and it has a lot of ifs attached to it,
5 but if an application across the delta had been pending
6 and if the matter had proceeded to make a final determin-
7 ation as to excluded areas, then what consideration would
8 have been given to the delta as an excluded area? But
9 that perhaps can be dealt with either in argument or
10 --

11 THE COMMISSIONER: Well,
12 I think that Dr. Peterson excluded it in his presentation
13 this morning.

14 Q Didn't you? Just so we
15 don't all lose track of this, you had that listed as
16 one of the -- it's on page 9, isn't it? Yes, "this
17 is one of the areas to be considered for special
18 restrictions if outright avoidance by pipeline construc-
19 tion and related activities is impossible, would be
20 the delta of the Mackenzie River."

21 Yes, well that's where that
22 sits then.

23 MR. SCOTT:
Yes, I'd overlooked that.

24 MR. MARSHALL: Mr. Commissioner,
25 just before leaving this general point, I'd like to
26 back on a matter Mr. Carter raised.

27 Now, Canadian Arctic
28 Resources have called evidence pertaining to the develop-
29 ment of the guidelines and it's been of benefit to all
30 of us, I'm sure. But the witness' involvement in the

Zoltai & Peterson
Cross-Exam by Scott

1 preparation of them, though, I think put him in a
2 very unique position and he has stated what their
3 status is, in his judgment. Now the terms of reference
4 of the Inquiry requires consideration of the guidelines
5 and in argument it's going to be necessary for all
6 counsel to argue as to whether or not the guidelines have
7 been met or they have not been met. Now, the impression
8 I am left with from the witness is that it may be
9 irrelevant whether they are met or not met because they
10 have no status in effect. I may be over-stating the
11 position that he outlined, but it seems to me this is
12 fairly fundamental. Are the views that have been pre-
13 sented in the evidence today simply to be accepted by
14 counsel when making submissions to you, sir, or are
15 we to find out whether or not that is the position of
16 the Government of Canada on this subject, or it has
17 some other position?

18 THE COMMISSIONER: The guidelines,
19 it seems to me, are simply that, guidelines, and the
20 government said they were to guide Arctic Gas and
21 Foothills in filing material. Then the government said
22 that I was to consider ^{the} measures you propose to deal with
23 the concerns laid down in the guidelines; but the guide-
24 lines have no statutory authority.

25 MR. MARSHALL: Well, I appreciate
26 that.

27 THE COMMISSIONER: And I think
28 Dr. Peterson's view expressed there, leaving aside his
29 adamant adversions on your interpretation, I think his
30 views expressed there are views that we wouldn't really

Zoltai & Peterson
Cross-Exam by Scott

1 quarrel with, he says the Statutes are still there --
2 The Territorial Lands Act and so on and so forth. We
3 all know that.

4 MR. MARSHALL: Yes, I thought
5 it was clear, but I guess Dr. Peterson had a different
6 view that the Statutes obviously were still there and
7 obviously had not been supplanted by the guidelines,
8 but the guidelines were additional to what was in the
9 regulations.

10 MR. ANTHONY: A point that
11 was made on page 7 of Dr. Peterson's evidence is that
12 there's nothing about the status of the guidelines.
13 The guidelines are there and it is certainly up to
14 counsel to argue whether or not they have been met in
15 the sort of research. I think the point that was attempt-
16 ed to be made there was that they are not environmental
17 protection requirements. They are merely guidelines, as
18 indicated.

19 THE COMMISSIONER: Yes. Let
20 me interrupt you. I think -- I think we're making a
21 lot out of something that isn't terribly vital.

22 Mr. Jakimchuk is quoted here.
23 He says, "The pipeline can be built within the require-
24 ments of the Northern Pipeline Guidelines."

25 Well, really just what Mr.
26 Jakimchuk is saying is, "I've read these guidelines and
27 we can meet these concerns." And he's treating them as
28 if they were statutory requirements which they aren't.
29 I don't think there's anything to spend any more time
30 on here, is there?

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Cross-Exam by Scott

1 MR. MARSHALL: That's fine, sir.
2 I'll be happy to leave it.

3 MR. SCOTT: Mr. Commissioner, I
4 don't want to prolong that argument, but just so Mr.
5 Marshall will be aware of our position, as he develops
6 his case and as it comes to argument, ^{the} guidelines are
7 viewed by Commission counsel for what it's worth as
8 a kind of check list, and not as a hurdle in a sense.
9 And because Mr. Marshall has an acceptable proposal
10 to deal with every item in that guideline check list,
11 that in our submission may not be enough. There may be
12 other environmental concerns, other social concerns
13 --

14 THE COMMISSIONER: Outside the
15 guidelines.

16 MR. SCOTT: -- outside the
17 guidelines.

18 THE COMMISSIONER: Oh yes.

19 MR. SCOTT: That he may have to
20 meet, as far as we're concerned.

21 THE COMMISSIONER: I think that's

22 --

23 MR. MARSHALL: I think I am clued
24 onto that, Mr. Scott.

25

26

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30

1 Q Mr. Zoltai, in
2 question number 10 you were asked to deal with
3 construction methods as they applied to fens and
4 you expressed in your answer some reservation about
5 Arctic Gas's proposal as you understood it. Now,
6 Mr. Marshall asked you about that and very quickly
7 got you onto the question of building roadways
8 across fens. I would like to just take you back
9 a step and as you perhaps know, the proposal, as
10 Mr. Marshall outlined it, is to place, I think five
11 or six feet of fill on top of the buried pipeline
12 across fens.

13 Now, what do you envisage
14 happening to that fill?

15 WITNESS ZOLTAI: If this
16 is all that they are proposing to do, I think that
17 the fill will simply slide off the pipe and just
18 kind of distribute itself along the mineral soil
19 interface.

20 Q And what will happen
21 to it when it comes to rest on a fen area?

22 A On top of a fen?
23 Again, unless there are some special measures taken
24 I think that the fill will sink into the fen.

25 Q Yes, and are some of
26 these fens up to ten feet deep?

27 A Yes.

28 Q Well, now, in question
29 number 9 you refer to the frozen core acting as a
30 dam across the fen in the second full paragraph of

Zoltai, Peterson
Cross-Exam by Scott

1 your answer. Now, for your information, that is
2 what we call in this Inquiry the Templeton Dam, after
3 the President of the Environmental Protection Board.

4 A Right.

5 Q You said in answer
6 to Mr. Marshall that this dam could be created in a
7 variety of ways and one of the ways was it could
8 be created by ground pushed up by the ice. Do I
9 have that correctly?

10 A By a mound, pushed up
11 by the ice.

12 Q Now, is this a con-
13 tinuous and developing process?

14 A I can visualize a
15 frozen shell around the pipe which will extend to
16 and above the surface of the fen.

17 Q Will it increase in
18 size above the surface of the ground?

19 A I think it can.

20 Q Yes. What I am
21 concerned about is the solution or one of the
22 solutions proposed for that, is to create berm
23 breaks in that dam. Now, what -- I am asking you
24 is what do you envisage happening to those berm
25 breaks, if anything, in the event that the dam over
26 a period of years continues to grow up?

27 A Well, I would think
28 that this would be a maintenance problem in maintaining
29 the berms. This is about the best that I can
30 visualize it.

1 Q Now, in question 21 of
2 your evidence on page 10 in the third paragraph,
3 in the third and fourth paragraph, you express the
4 opinion that "any revegetative program by itself,
5 whether with agronomic or native species will not
6 prevent thermal erosion in the short term."

7 Then in the Next paragraph you say, "the subject of
8 insulative supplement for revegetation programs is
9 incompletely known. The artificial insulative
10 material should be biodegradable, possibly covered
11 thin ly by soil to permit the germination of the
12 sown seeds. I feel that much experimentation
13 is necessary to devise a revegetation program that
14 is effective in checking erosion by running water
15 and by thermal degradation, both in the short and in
16 the long term."

17 Well, now, -- and then you
18 deal with the same problem in the third paragraph in the
19 answer to Question 22. Now, Mr. Marshall has referred
20 you to some of the erosion devices that the applicant
21 proposes. Do I understand that apart from erosion
22 your concern here is revegetation itself and the
23 protection of the terrain?

24 A My concern here is
25 mainly the protection of the terrain.

26 Q Frozen soils?

27 A Yes.

28 Q And in that context
29 whether there is erosion or not, that is, whether
30 Mr. Marshall's devices work or not, there will still be

Zoltai, Peterson
Cross-Exam by Scott

1 the necessity for revegetation?

2 A I am not sure that
3 I understand your -- there is a need for revegetation,
4 yes.

5 Q And that is for
6 thermal reasons?

7 A I feel that the
8 revegetation programs as proposed are mainly for
9 stabilization of the surface due to water erosion
10 and they will not be very effective as far as
11 checking of thermal erosion is concerned.

12 Q All right. Well, now
13 you refer to the necessity for experimentation in
14 this area and I wonder if you could tell us what
15 sort of experiment you have in mind?

16 A Again, I must speak only
17 not from experience, but from general knowledge. My
18 concern is that on an area where vegetation has
19 been disturbed, one needs to maintain or re-establish
20 the insulating value of the surface and this could
21 be rapidly attained only by artificial means, and then
22 in order to provide an ongoing protection, perhaps the
23 vegetation cover should be encouraged to come in, and
24 this is why I feel that perhaps a combination of
25 artificial installation, plus revegetation may
26 be the answer.

27 Q Are you suggesting
28 field experiments of that type?

29 A I really don't see any
30 other way of doing it.

1 Q Well, now, in question
2 22 also, in the second paragraph, you say that the
3 prevention of artificial palsa formation in wet
4 fens must be demonstrated experimentally, and does
5 that mean as well by field experiment?

6 A Yes, this is what
7 I had in mind.

8 Q Yes, and what sort of
9 experiments do you think could be developed? In
10 general terms.

11 A Of course what I would
12 like to see is a -- perhaps a full scale model of
13 a refrigerated gas line in wet fens. This would be
14 the only way that you can get the absolutely certain
15 figures.

16 THE COMMISSIONER: And
17 how long would it take to, observing the results of
18 the experiment, how long would it take to make a
19 determination about --

20 A Well, I would only
21 be guessing here, but I would think that perhaps
22 a year or two may give enough answers.

23 MR. SCOTT: Mr. Zoltai, if
24 a full scale experiment of the type you envisage is
25 impossible, can you envisage any field experiments of
26 more modest dimension?

27 A There may be. I really
28 can't answer this.

29 Q Question 20, Mr. Zoltai,
30 you were asked to and did express an opinion on the

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Cross-Exam by Scott

1 various routes from a terrain point of view and as
2 you said in giving your evidence; your evidence was
3 prepared at a time when the prime route was what we
4 now call the old prime route and the new prime route
5 had not been formally presented to the Inquiry.

6 Are you in a position to
7 comment on or to rate in the way that you have
8 rated the others, from a terrain point of view, the
9 new prime route? That is, the cross-delta portion
10 or any part of that portion?

11 A From my knowledge of the
12 delta, I don't know exact, I haven't looked at the
13 exact location of the alignment across the delta,
14 but from my general knowledge of the delta I would
15 think that this would be a hazardous route.

16 Q How do you rate it as
17 compared with the -- and what shall I call it -- the
18 old prime route or the interior route?

19 A Of course each route
20 has its advantages and disadvantages from the
21 terrain point of view, but I would think that the
22 interior route would probably be the least difficult
23 from a terrain point of view.

24 Q And what from a terrain
25 point of view is next?

26 A I think it is a toss
27 up between the old prime route and the present one.
28
29
30

Zoltai, Peterson
Cross-Exam by Scott

Q Now, in question 15

which is found at the bottom of page 6, you were asked to and did recommend certain areas that should be, in your opinion, avoided in route selection. Let me just read the first part of your answer.

"As a result of my research, I recommend two general kinds of terrain conditions to be avoided. These are: (1) areas that are highly susceptible to terrain and surface damage as outlined on page 42, report 73-4 and mapped on the maps of open file E.S.P. 102.

MR. MARSHALL: Excuse me, Mr. Scott, when the witness read that, he added a phrase in the second line after "avoided".

MR. SCOTT: He did because I made a note of it and I can't find my note.

A Right. I added the phrase "or if this is not possible, be treated with special care."

MR. SCOTT: That is correct. Or that is my recollection at least. Well, can you explain for the Commission what is intended by that paragraph?

A In the course of our work we developed a rating of surface susceptibility to disturbance. And this rating relates to a specific type of disturbance, a fairly light to moderate surface travel, on different types of terrain and we rated, I think, six. There were six ratings from the least susceptible to the most susceptible.

Zoltai, Peterson
Cross-Exam by Scott

These related to the reaction of the terrain to this specified disturbance. In other words, the consequence of the disturbance was rated from 1 to 6, from the least susceptible to the most susceptible and then this system was used to map. I am not sure now, maybe 8 or 9 map sheets on this basis.

Q What do you mean by using
as your control a moderate influence?

A It is defined in our
report, I think maybe if I can find it.

Q On page 31 of your report?

A On page 31, yes. And I
will read it from this report, from page 31.

"For the purpose of this study, susceptibility to surface damage can be defined as a reaction of the surface and the subsurface to a disturbance."

Q Can I direct you to the last paragraph of the page?

A Right. "The disturbance used in this study is disturbance consists of a single pass with a bull dozer blade down to cut off the tops of hummock in winter or early spring followed by traffic limited to less than four passes by a seismic crew."

Q Well now, stopping right there. Is that the disturbance which your rating is obtained?

A Yes.

Zoltai, Peterson
Cross-Exam by Scott

1 Q I think, Mr. Commissioner,
2 this report is already an exhibit. Did Mr. Anthony
3 file this report?

4 MR. ANTHONY: Yes, I did.

5 Q All right. The map,
6 not an exhibit, do you have a copy of the map, Mr.
7 Zoltai?

8 A No, I do not.

9 MR. ANTHONY: I think that
10 would be helpful. If I could obtain copies of E.S.P.
11 102 will also be filed as an exhibit.

12 Q Well now, are you able
13 to note without reference to the map which of the ratings
14 that is, which of the numbered ratings you intended to
15 exclude by your first category?

16 A In this rating of 1 to 6,
17 we were intending to exclude or include the highest
18 rating, rating no. 6 as the areas that should be
19 avoided if possible.

20 Q So that your answer, "1",
21 is really saying, I recommend that you exclude rating
22 6 as shown on our maps as defined by our report?

23 A Exclude or treat with
24 special care, yes.

25 Q Well now, in question 16
26 on page no. 7, you deal with potentially
27 difficult locations and the second already referred to
28 by Mr. Marshall is an area on the western flank of the
29 Franklin Mountains north of Willowlake River. Could
30 you either explain the extention of that location or

Zoltai, Peterson
Cross-Exam by Scott

1 point it out on a map so we can understand how far
2 you intend to go.

3
4 A From my own personal
5 knowledge, I know of several springs and seepage areas
6 within, I think they are in about a stretch of 10 miles,
7 north of the crossing, but I would have to consult my
8 notes to be more precise.

9 Q So, would I be correct then
10 to think that you are talking about the immediate
11 vicinity of the Willowlake River and not the entire
12 flank of the mountain?

13 A That is where I have
14 personal knowledge of having a high ground water activ-
15 ity.

16 Q Well, you are not
17 including the area around Norman Wells, are you?

18 A Not from personal know-
19 ledge. I have had conversations with other people who
20 would include this into an area of ground water
21 activity.

22 Q So, can you tell us which
23 of the applicant's line this potentially difficult area
24 has reference to?

25 A North of Willowlake River,
26 is the Foothills alignment.

27 Q Now, in question no. 19,
28 you deal with the consequences of fires and in the first
29 paragraph of your answer, you say "that the active layer
30 would increase and this is after a fire, to nearly twice

Zoltai, Peterson
Cross-Exam by Scott

1 its normal thickness within five years of a fire.
2 Large amounts of water would be released as the near
3 surface permafrost thaws causing subsidence and on
4 moderately steeply-sloping terrain, considerable soil
5 movement." Now, I want to sort of turn that question
6 around, if I can, and determine whether you have any
7 views as to whether a burnt over area, burnt over two
8 or three years, let's say, three or four years before,
9 and not on a slope is better or worse from a terrain
10 point of view and a construction point of view than
11 an immediately adjacent area unburnt?

12 A According to my experience,
13 this period of time was sufficient to allow as much
14 subsidence to take place as, well, at least most of
15 the subsidence, to take place, which means that the
16 surface should be more stable and therefore less prone
17 to further subsidence, if more disturbance would take
18 place, so I would think that the surface would be more
19 stable. Therefore construction should cause less
20 surface damage.

21 Q So that, do I understand
22 you to say that you would, providing it is not on a
23 slope, and providing it is three or four years have
24 gone by since the fire, would you prefer that kind of
25 area from a terrain point of view?

26 A Yes, if there is a choice
27 between a burnt and an unburnt area of the type that
28 you described, yes.

29 Q And in layman's terms, do
30 I understand that the reason for that is that the soil

Zoltai, Peterson
Cross-Exam by Scott

1 as a result of exposure has dried out?

2 A Yes.

3 Q Well now, why do you
4 exclude a slope three or four years after a fire from
5 that preferable category?

6 A Simply because in certain
7 areas, especially in the northern portion of the route,
8 the subsidence causes soil movement. In other words,
9 landslides may develop and they do develop on steep
10 slopes after fire and this can expose subsurface ice
11 lenses and therefore can cause further thermal erosion
12 and I feel then that the possibility of such erosion is
13 far greater on steep slopes than it is on relatively
14 level or slightly sloping ground.

15 Q Now, Mr. Zoltai, we heard
16 yesterday. Were you here when I asked questions of the
17 Foothills panel about the C.N.T. line?
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Zoltai & Peterson
Cross-Exam by Scott

1 Q Mr. Zoltai, we heard --
2 did you hear that discussion?

3 WITNESS ZOLTAI: Yes.

4 Q Yes. Well now, first of
5 all are you familiar with that line?

6 A Yes.

7 Q Yes, and we've heard that
8 it is all or partly abandoned, is that correct?

9 A Yes.

10 Q Is it all abandoned?

11 A To my knowledge it is, but
12 I really don't know for sure.

13 Q Yes, and we've heard that
14 that is also already disturbed in the sense that towers
15 have been constructed on it and it's been cleared and
16 vehicles have moved along it from place to place. Is
17 that correct?

18 A Yes.

19 Q Indeed I take it that
20 from place to place it's been used as a winter road,
21 has it?

22 A It shows signs of use,
23 yes.

24 Q Well now, how would you
25 rate terrain such as this as a site for a project such
26 as a pipeline? From a terrain point of view.

27 A Well, since the line has
28 been cleared some years ago, I think that most of the
29 subsidence that would take place after clearing has
30 already taken place, and most of the thermokarst

Zoltai & Peterson
~~Cross~~-Exam by Scott

1 development that would develop after clearing has
2 already taken place. Therefore the stable, relatively
3 stable portions of the line should be fairly good
4 construction sites.

5 Now, at the same time the
6 steeply sloping portions of the line, such as one may
7 find close to creeks and so on, may show and do show
8 erosion, signs of erosion. Therefore these portions
9 should be avoided. But the rest of the line should be
10 reasonably stable.

11 Q Mr. Zoltai, Mr. Anthony
12 has told me that he's made Report 73-4 to which you've
13 referred, an exhibit. Well now, beginning on, or in this
14 volume there are a number of recommendations that are
15 made, most of which you have covered in your evidence
16 today, and you stand by them, do you?

17 A Yes, I do.

18 Q Yes. Well now, in para-
19 graph 9.2 on page 42, apart from the scientific matters
20 and under the heading:

21 "Matters relating to judgment -- related to
22 judgment,"

23 you set out four conclusions under the heading:

24 "Prevention versus repair; built for worse
25 condition; where to apply special construction
26 methods; and enforcement."

27 I want to ask if it is still your view that these
28 -- let me put it another way. Are these matters still
29 your view at the present time?

30 A In a sense, in essence I

Zoltai & Peterson
Cross-Exam by Scott

1 think they are.

2 Q Do you have any qualific-
3 ations you want to add to any of them?

4 A Well, I'd have to study
5 what I've written several years ago, but I would
6 think that I would stand by most of these value
7 judgments.

8 Q Would you let Mr. Anthony
9 know as quickly as you can if you have any qualifications
10 you want to add? May I have an answer to my question,
11 I want to know whether you still recommend these things
12 or whether you would make a change?

13 A I don't think I would
14 wish to make a change.

15 THE COMMISSIONER: If you
16 decide overnight, I think you will both be here tomorrow,
17 and if you decide overnight that there is any change
18 you'd like to make, you could tell us in the morning.
19 But for now we'll take it that there are none you wish
20 to make.

21 A Right.

22 M R. SCOTT: Q Well now, Mr.
23 Zoltai, in your curriculum vitae or vitae, however it's
24 pronounced, you've have described yourself as, among
25 other things the chairman of the Department of Environ-
26 ment Task Force on Pipeline Assessm ent, and the report
27 of the Department of Environment Task Force has either
28 been referred to at this Inquiry and is, I think, an
29 exhibit, and in the appendix to it, there are -- there
30 is a list of the authors of the various portions of

Zoltai & Peterson
Cross-Exam by Scott

1 the report and the topics by number that each of those
2 authors contributed.

3 A Yes.

4 Q Yes, and opposite your
5 name there are reflected some eight or nine topics
6 in which you, I understand, had drafted and are
7 responsible for the recommendation.

8 A Yes.

9 Q Do you still stand by
10 those recommendations?

11 A Yes.

12 Q And I take it that most
13 of them, perhaps not all of them, have been presented
14 in the transcribed evidence that Mr. Anthony has
15 referred to.

16 A Yes. Some of the concerns
17 have been answered by the amendments of the CAGSL
18 application.

19 Q Well now, J.N. Stein is
20 shown as having been responsible for certain contri-
21 butions to the Department of the Environment Task Force.

22 A Yes.

23 MR. SCOTT: Mr. Anthony, is he
24 the Dr. Stein who will be giving evidence on your fish
25 panel?

26 MR. ANTHONY: Yes, he is.

27 MR. SCOTT: Q As a contributor
28 or as a co-ordinator or as a supervisor or chairman,
29 have you any capacity, Mr. Zoltai to comment on the
30 contributions assigned to other persons on this appendix?

Zoltai & Peterson
Cross-Exam by Scott
Cross-Exam by Lutes

1 A I can only comment on it
2 as the chairman. I ~~have~~ taken place in general discussions
3 regarding the various concerns that are listed, but I
4 could not testify to the technical background that
5 prompted those concerns.

6 MR. SCOTT: Those are all the
7 questions I have. Thankyou, Mr. Zoltai.

8 I think at this stage the
9 cross-examination has got rather mixed up, but I
10 think perhaps Mr. Lutes is next, and perhaps we can
11 revert to our original plan which was to deal with
12 both members of the panel.

13 MR. LUTES: That's fine with
14 me unless you want to finish --

15 MR. SCOTT: No, no.

16 CROSS-EXAMINATION BY MR. LUTES:

17 Q Mr. Zoltai, I'm interested
18 in just following up for a moment the matter of the
19 location of the unfrozen fens. I might ask you firstly
20 whether you've considered the location of the fens
21 in relation to the Foothills Pipe Line ?

22 A I had access only to one
23 set of maps of the alignment, which is the environmental
24 maps, and I didn't think that they were detailed enough
25 for me to allow an analysis of the route.

26 Q Were you aware that
27 Foothills is proposing that the gas moving through
28 its pipeline would not be chilled, essentially from a
29 point south of Fort Simpson?
30

1 A Yes.

2 Q Could you comment on your
3 concerns expressed with respect to the unfrozen fens as
4 it relates to the unfrozen, or to the gas moving
5 through unchilled south of Fort Simpson?

6 A I don't think it will have
7 any effect on the fens, that is the unchilled gas
8 should not have any effect on the unfrozen fens. Now,
9 undoubtedly there will be some frozen lenses that the
10 line will cross, and these will probably thaw and sub-
11 side. But as to the effects on the fens, I don't think
12 there will be any.

13 Q These, of course, are the
14 tradeoffs that you make when you're moving gas through
15 discontinuous permafrost.

16 A Right.

17 Q Could you relate the
18 problem with the fens, as you see it -- and I know it's
19 difficult to relate it in terms of numbers -- could you
20 relate the magnitude of the problem as you see it, south
21 of Fort Simpson and north of Fort Simpson? In other
22 words by not chilling the gas south of Fort Simpson,
23 would your judgment be that we have eliminated a sub-
24 stantial amount of the problem, as you see it with the
25 fens?

26 A As you realize, I see the
27 problem of putting a chilled line through a fen as a
28 major problem; in this context I would think that the
29 unchilled gas south of Fort Simpson will have far less
30 impact on the environment than the chilled gas would

Zoltai & Peterson
Cross-Exam by Lutes

1 from the unfrozen fens north of Fort Simpson.

2 Q You'll be delighted to
3 know I'm just eliminating about half the questions that
4 have already been asked. Could I just go over again,
5 and I think that Mr. Scott just went over this with
6 you briefly. The groundwater problem that you fore-
7 see north of the Willowlake River crossing and I think
8 you just mentioned to Mr. Scott you see that problem
9 particularly with reference to our alignment.
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1 A Right.

2 Q Could you describe
3 for us what are the groundwater problems as you
4 see them and you might also tell me whether you
5 can isolate them and locate them for me on the
6 map.

7 A The problem as I
8 see it is that the line would cross an active
9 water discharge area; in other words, an area where
10 there is a great deal of groundwater moving downslope
11 within the active layer, where there is an active
12 layer or within the soil, in the case of the
13 unfrozen, non-permafrost areas. Now, introducing a
14 chilled pipeline will undoubtedly interfere with the
15 movement of the groundwater and then we can foresee
16 a chilling of the water as it moves across the
17 pipeline, possibly deflected below the pipeline
18 if the soil is sufficiently deep over bedrock or
19 else ponding it and forcing it to go over the chilled
20 line in which case icings can develop.

21 Q You mentioned that
22 the location of the groundwater problem is approxi-
23 mately ten miles north of our proposed Willowlake
24 River crossing?

25 A I can point it out on
26 your alignment sheets. I have just looked at them
27 during the lunch break.

28 Q You say that you
29 can point it out on the alignment sheet?

30 A I can, yes.

1 Q I don't have the large
2 alignment sheet here, but I do have our environmental --

3 A Perhaps if I just
4 describe it in words. There is a fairly large mountain
5 range just north of the Willowlake River crossing
6 and it is on the flanks of this mountain range
7 that this problem arises.

8 Q Okay. I guess what
9 I am having a little difficulty with and what I would
10 really like to explore, I gather that whatever this
11 problem is as you see it, the ground water is spread
12 over a wide area, it is dispersed over a mile or
13 two miles or three miles?

14 A I personally have
15 seen several springs in the area and springs which
16 have somewhat mineralized water.

17 Q Well, I think that is
18 really what I am driving at. Are we talking about
19 a broad movement of water, visualize a river or
20 a lake, or are we talking about the location of
21 springs, and if so, can you identify, you know, with
22 a little more particularity where this occurs?

23 A Apart from what I have
24 already said I don't think I can be more specific.
25 I really haven't done any groundwater studies in the
26 area to see just how localized the movement is, whether
27 we are dealing with a sort of an underground river
28 or else a broad sheet movement. My suspicion is, is
29 the later, that you have a fairly broad seepage
30 slope.

Zoltai, Peterson
Cross-Exam by Lutes.

1 Q If there is a fairly
2 broad seepage on that slope, is the source of that
3 water springs?

4 A The spring is where
5 groundwater exits from the ground --

6 Q So it isn't the
7 source of the water? The source of the water?

8 A The source of the
9 water would probably be the mountains where rain
10 falls and then penetrates into the soil and
11 comes out of the ground at the foot of the mountains.

12 Q Okay, well, these
13 questions may seem a little simple to you, but I
14 can assure you that I don't know the answers to them
15 and I am really interested in exploring with you,
16 you know, this problem of the groundwater in this
17 location. At what depth would the groundwater
18 be moving at?

19 A Again, I am not
20 competent to answer this question. I really can't,
21 I haven't done any hydrological studies at all.

22 Q Are there any other
23 locations on our alignment where you suspect, or you
24 have noticed that there may be groundwater problems?

25 A I suspect groundwater
26 discharge areas in the Norman Wells area, again, on
27 a similar situation on the flanks of a mountain.

28 Q I suppose the purpose
29 of my asking you these questions is really to ask
30 you whether it is possible to move through or around

1 the groundwater problems without a major realignment
2 of the pipeline location?

3 A I really don't know.

4 Q Could I ask you to
5 turn to the answer to your question 18 which
6 relates to your proposal that some compromise between
7 the route selected by CAGPL and Foothills would be
8 the preferred route in traversing this area, and I
9 think probably, and I may be incorrect, but I think
10 your suggestion is that Foothills follow the
11 CAGPL route on the north side of the Willowlake
12 River crossing, presumably to avoid the groundwater
13 problem that you see there, and then after making
14 the river crossing to come to the west closer to
15 the river --

16 A Right --

17 Q And which would be
18 west of our present alignment and then follow the
19 river a little more closely south?

20 A More or less the
21 original CAGPL alignment.

22 Q Yes. I am not
23 sure that I follow your reason for recommending that
24 our present alignment be moved west closer to the
25 river and I am wondering if you could just elaborate
26 on what you see as the benefit of that change.

27 A A large portion of the
28 present alignment crosses or follows the flanks, goes
29 on the contours, so to speak, of the Ebbutt Hills and
30 there are a good number of runoff channels down this

1 -- crossing this alignment, and I can just see it
2 as a potential source of problem. That is just my
3 reason for preferring a route that would go farther
4 from the foot of the Hills.

5 Q I take it that this
6 water is moving off the Hills and down towards the
7 river?

8 A Yes.

9 Q I am advised that the
10 location, that our alignment is presently located on
11 a slope of approximately 3° and that the location
12 that you are suggesting for the line would be
13 virtually on a nil slope and that one of the consider-
14 ations would be that there would be better drainage
15 for that water in the present location because of the
16 higher slope.

Zoltai & Peterson
Cross-Exam by Lutes

1 A As I said before, I had
2 no access to the mosaics so I could not make a good
3 analysis of the route, but just looking at the aerial
4 photographs in a general location of the alignment, it
5 seemed to me that there were some reasonable gullies
6 coming down the hill. This is what prompted me to say
7 this.

8 Q But you're suggested that
9 simply because you anticipated some problem with the
10 movement of water.

11 A That's right. If it can
12 be easily overcome by some engineering practice, well
13 fine.

14 Q I'm also advised that the
15 location further west towards the river is highly boggy.
16 Can you comment on that?

17 A I have looked at the orig-
18 inal Gas Arctic alignment and it did have some bogs in it
19 but it didn't seem to me particularly boggier perhaps
20 than an average figure for the area.

21 THE COMMISSIONER: Mr. Lutes,
22 it might be helpful if we adjourned now.

23 MR. LUTES: Well, that would
24 be helpful to me.

25 THE COMMISSIONER: You can
26 think of your cross-examination overnight.

27 MR. LUTES: I only have one more
28 question and that's what we were discussing, but it
29 would be helpful if I could do it tomorrow, sir.
30

Zoltai & Peterson
Cross-Exam by Lutes

1 You know, it's sort of difficult for me to --

2 THE COMMISSIONER: I understand.

3 MR. LUTES: I really would
4 appreciate that.

5 THE COMMISSIONER: Your learned
6 friends are all veterans with regard to frost heave,
7 just like the morning papers. It will be worth it.

8 MR. LUTES: It will be a really
9 good question.

10 THE COMMISSIONER: Well, I
11 think that we've had enough for today and we'll look
12 forward to being fresh in the morning at 9:30 and there
13 will be further questions for Dr. Peterson and Mr.
14 Zoltai. When we've completed their / ^{evidence} I understand Mr.
15 Novakowski will be along. So 9:30 in the morning.

16 (PROCEEDINGS ADJOURNED TO DECEMBER 12, 1975)
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